Special Edition

PC WORLD

May 1985 $2.95
$3.75 Canada

The Comprehensive Guide to IBM Personal Computers and Compatibles

Official Beginner's Guide

Up and Running!

Beginner's Guide to Word Processing, Data Management, Spreadsheets, Communications, Graphics, and Programming

Gateways: The Easy Road to On-Line Information Services

Double your IBM PC's processing speed for under $650.

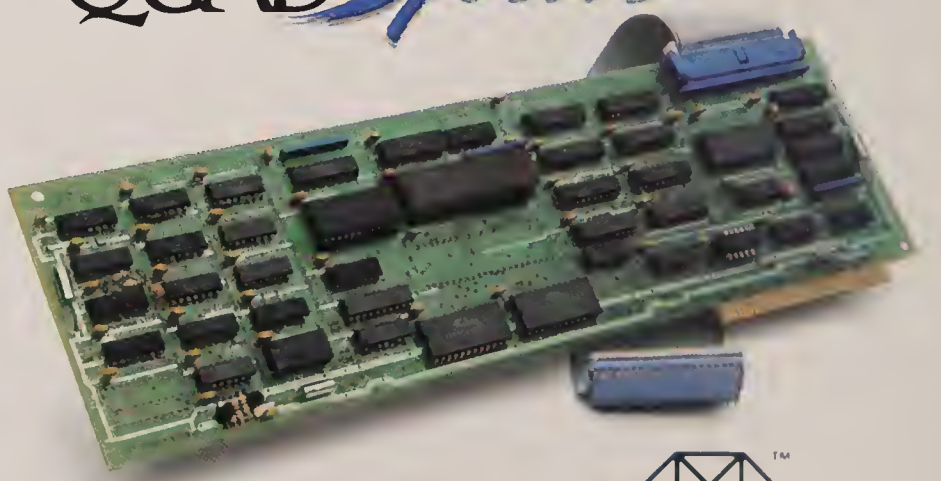
AT speed for your IBM PC, with QuadSprint by Quadram.

Quadram introduces a rapid advancement in IBM PC performance. QuadSprint. The innovative expansion board that doubles the processing speed of your personal computer. Just plug the totally transparent QuadSprint into your system and watch **all** your PC programs (Lotus 1-2-3, dBASE III, Wordstar, and more*) run faster and more efficiently than ever before... without special commands or interface software.

But best of all, you can pick up QuadSprint without running up a huge bill. At less than $650, QuadSprint is about half the price of other accelerator (turbo) cards and turns your PC into a machine that's virtually as fast as the new PC AT.

So make your own rapid advancement. To the Quadram dealer closest to you. And see how to double the processing speed of your IBM PC. With QuadSprint by Quadram.

QUADSprint™



QUADRAM™
An Intelligent Systems Company

4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

IBM* PC, PC AT are registered trademarks of International Business Machines Corporation. *1 2 3 is a trademark of Lotus Development Corp. dBASE III is a trademark of Ashton Tate, Inc. Wordstar is a trademark of MicroPro Corp. Copyright 1984 Quadram Corporation. All rights reserved.

Circle 226 on reader service card

For the IBM PC*, XT*, AT* and compatibles.

We put hard disk storage and backup where it belongs.

Maximum storage in a minimum space.

A mass storage solution for personal computers need not occupy massive amounts of space.

That's why Kamerman Labs packs an entire hard disk storage and backup system into a package only 2½ inches high.

In fact, our Masterflight system is so well integrated with your PC, it looks like it should have been there all along.

Hard disk storage.

Inside the Masterflight is a high-performance hard disk system, available in 10, 20 or 30 Megabyte versions. You get up to 100 times the storage capacity of floppies. At up to 10 times the speed. Spend more time working and less time waiting.

Streamer tape backup.

Any professional working environment demands a reliable backup solution. The Masterflight provides it through a high-performance streamer tape that backs up an entire 10 Megabytes in less than 4 minutes. Streamer tapes are available in 20, 40 and 60 Megabyte capacities. Instead of just a hard disk, Masterflight gives you a complete data storage solution.

Power control.

Masterflight directs power to your computer, monitor, printer and two other devices through front panel switches. No more blind groping on back panels to power up your system.

Surge protection.

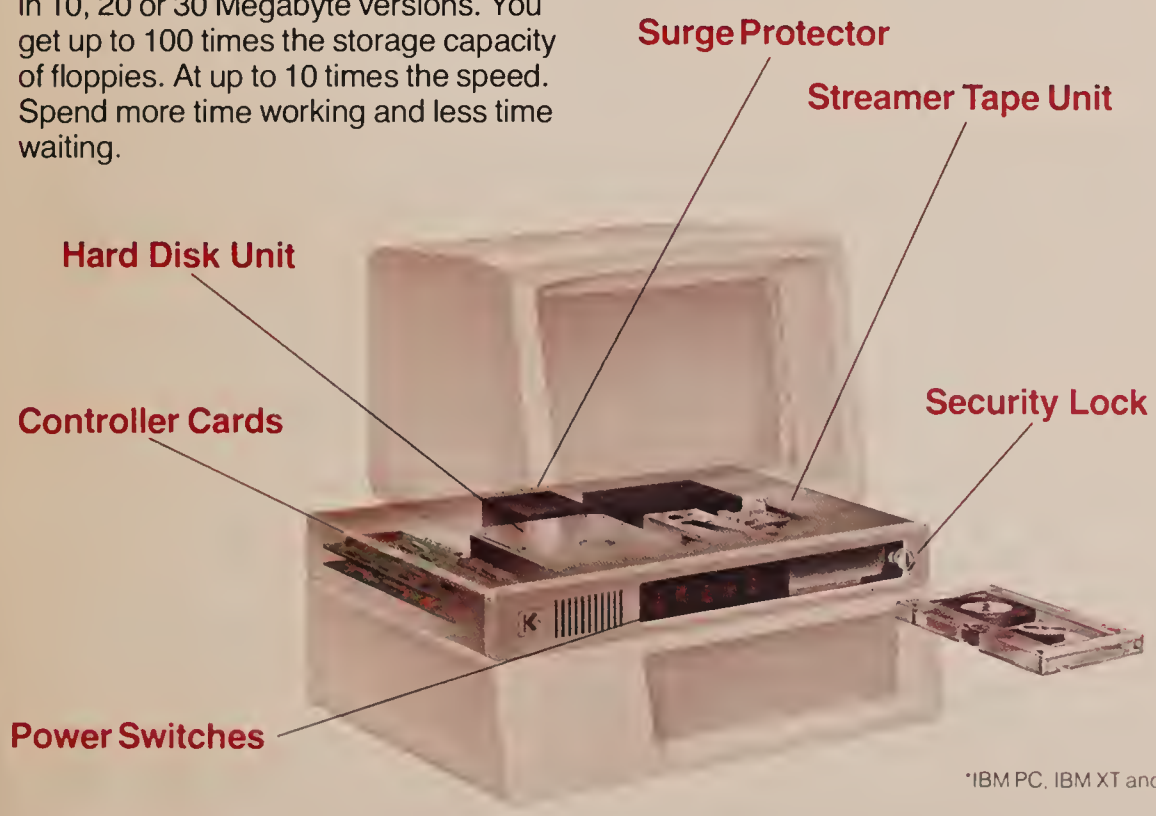
A little power surge can produce a lot of damage. Masterflight protects your system with special circuitry that filters out spikes, surges and line noise.

Security.

Masterflight guards access to your system through a fully lockable power switch.

Phone today. Dealer and OEM queries welcome. 800-522-2237

In Oregon, Hawaii and Alaska call 503-626-6877



Kamerman Labs

8054 SW Nimbus, Bldg. 6
Beaverton, OR 97005
Phone 503-626-6877

See us at
COMDEX/Spring '85
May 6-9, 1985
Georgia World Congress Center,
Atlanta, Georgia

*IBM PC, IBM XT and IBM AT are registered trademarks of International Business Machines

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles
May 1985

128 Islands in the Mainstream

PC users in corporations–once the Robinson Crusoes of computing–now see their islands joined to mainframe systems. Will this increase their power or cost them their independence?

148 Gateways to On-Line Services

Victims of information overload, take heart–relief is in sight. Software and service intermediaries deliver the power of on-line data base searching without the pain of complex commands or an avalanche of options.

239 PC World Beginner's Guide: Up and Running

This special section reintroduces the essential PC applications. Included are tutorials and descriptions on word processing, spreadsheets, data base management, communications, graphics, and programming.

Getting Started

120 Tapping Into On-Line Data Bases, *Chris Yalonis and Anthony Padgett*
Use the PC to channel the torrent of on-line data.

Community

128 Islands in the Mainstream, *Bill Weil and Ted Nace*

136 Birth of a Sales Tool, *Melinda Rickelman*
The PC is becoming a valued contemporary counterpart to the old foot-in-the-door routine.

Review

148 Gateways to On-Line Services, *Jeremy Joan Hewes*

158 DG/One for the Road, *Merrily Shinyeda*
Data General's new PC compatible is sleek, portable, and more powerful than any other machine you can fit in your briefcase.

166 Keeping Murphy's Law at Bay, *Bill Dauphinais and Leonard Darnell*
Microsoft Project helps track costs and organize projects.

174 OfficeWriter: Simply Dedicated, *Rebecca Bridges*
OfficeWriter raises the ante in the word processing wars.

186 Speaking in Codes, *Judy Getts*
The best DES and RSA encryption software

PCjr World

196 Move Over MacPaint, *Katie Seger and Peter Forde*
ColorPaint from IBM gives you graphics plus something the Mac can't—color.

State of the Art

206 A Matter of Public Record, *Brad Baldwin*
A look at *DATASTORE:lan*, an early and potent entry in the network application software sweepstakes

Hands On

218 Tactics for Teleconferencing, *Lisa B. Stahr*
How to use teleconferencing to boost business communications

226 On-Line Search Strategies, *Barbara Newlin*
Tips for on-line searching that can improve search results

Departments

11 David Bunnell

23 Eric Brown

31 Letters

58 PC World View, *Katie Seger*

47 The Help Screen, *Karl Koessel*
A bigger BASIC—up to 640K of program code and data

70 Compatibles Update, *Edited by Ken Greenberg*

94 From the Software Shelf
The Spreadsheet Auditor helps you spot errors, and *dB/Compiler* speeds up programs written in *dBASE II*.

301 *.*, *Edited by Steven Cok*

317 Just Announced, *Wes Nihei*
PC products of note

PC World Directory

361 A classified guide to products and services

Index

377 Advertisers

Photo/illustration credits: David Bishop, 174-175, 250, 266; Peter Ford, 198; Matthew Foster, 95; John Goodman, 59; John Hersey, 167-168; Lonni Sue Johnson, 263; Ed Kashi, 61; Leslie Lerner, 207; Steve Lyons, 229; Lane Smith, 187, 189; George Steinmetz, 71; Fred Stimson, 74, 149, 159-160, 242-244, 247, 288-289; David Suter, 121, 123; Kurt Vargo, 130, 132-133, 135; Mick Wiggins, 136-137, 196, 218-219.

PC WORLD

Volume 3, Number 5
May 1985

David Bunnell
Publisher

James E. Martin
Associate Publisher

Jacqueline Poitier
Associate Publisher

Cheryl Woodard
Associate Publisher

Harry Miller
Editor

Editorial
Associate Editors: Eric Brown, Ken Greenberg, Robert Luhn
Editorial Mgr.: Cynthia Hamburger
Senior Copy Editor: Tema Goodwin
Technical Editor: Karl Koessel
Assistant Editors: Darcy DiNucci, Ted Nace
Product Review Editor: Christine Whyte
Copy Editors: Barbara Lewis, Bonnie Monte, Peggy Nauts
Editorial Assistant: Wesley Nihei
Contributing Editors: Burton L. Alperson, Keith Richard Cook, Steven Cook, Eddie Currie, Danny Goodman, Jeremy Joan Hewes, Larry Jordan, Lawrence J. Magid, Janette Martin, Seth Novogrodsky, Stuart R. Schwartz, Merrily Shinyeda, Andrew T. Williams

Art
Designer: Marjorie Spiegelman
Art Director: Mick Wiggins
Associate Art Director: Christopher Burg
Associate Designer: Monica Ames
Design Associates: Barbara Adamson, Donna Sharee, Judy Sitz
Assistant to the Art Director: Nan Cassady

Production
Production Director: Herbert Linden
Senior Production Mgrs.: Frances Mann, Lee R. Trevino
Editorial Production Mgr.: Ellyn L. Hament
Production Editor: James Felici
Ad Traffic Coordinator: Jayne Boyer
Telecommunicators: Mark L. Duran, Susan M. Ford, Len W. Shirts
Display Advertising Supervisor: MaryAnn DePietro
Production Assistant: Otto Waldorf

Advertising Sales
Director of Marketing & Advertising Sales: James E. Martin
Account Managers
Northern California (San Francisco) & Northwest: Meredith Browning
Northern California (San Jose): Margaret O'Reilly
Southern California (Los Angeles) & Southwest: Susan Curtis, Joanne Gillis
Midwest (Chicago): Richard Arzaga
New England (Boston): Larry Hilderbrand
Northeast (New York): Ray Tuzzeo
Mid-Atlantic (Philadelphia): P. J. Boatwright
Southeast (Atlanta): Judy Sutter
Action Ads/Directory Sales: Carol Watson
Advertising Services Mgr.: Ray Petsche

PC World Books
Editor: Larry Wilson
Editorial Production Mgr.: Cynthia Mayer
Assistant Editor: Joanne Clapp

Circulation
Director of Circulation: Penny Ertelt
Services Coordinator: Phil Semler
Promotions Mgr.: Laurie King
Single Copy Sales
Director: George Clark
Single Copy Sales Mgr.: William B. Cox
Dealer Sales Mgr.: Mary Ruth Kristoff
Account Mgrs.: Elaine McMahon, Jo Muilenburg

Corporate Development
Special Projects: Jeffrey S. Glines
International: Karen G. Dowell
Publishing Assistant: Randi Glaser

Communications
Manager: Noreen A. Browning

Administration
Director: Janet D. McGinnis
Personnel Mgr.: Sarah Cox
Accounting Mgr.: Pat Murphy
Facilities Mgr.: Joseph Wollenweber
Assistant to the President: Christina W. Spence

Corporate
PC World Communications, Inc.

David Bunnell
Chairman

Bartlett R. Rhoades
President & CEO

Herbert Linden
Vice President

Jacqueline Poitier
Vice President

Cheryl Woodard
Vice President

Andrew Fluegelman
Editorial Director

PC World™ (ISSN 0737-8939) is published monthly at $23.75 for one year (12 issues), $42.75 for two years (24 issues), $57.75 for three years (36 issues) by PC World Communications, Inc., 555 De Haro St., San Francisco, CA 94107. Additional postage outside the U.S. and Canada $25 per year surface mail, $100 per year airmail. Outside the U.S. all orders must be prepaid in U.S. funds drawn on U.S. banks. For questions regarding subscriptions and to place subscription orders call toll-free 800/247-5470 (in Iowa: 800/532-1272). Second-class postage paid at San Francisco and at additional mail offices.
POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 6700, Bergenfield, NJ 07621. Editorial and Business Offices: 555 De Haro St., San Francisco, CA 94107, 415/861-3861.
CompuServe 74055,412
The Source STE908
PC World™ is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Copyright © 1985, PC World Communications, Inc. All rights reserved. The following are trademarks of PC World Communications, Inc.: PC World View, *.*, PC World. *PC World*™ is a member of the CW Communications, Inc., group, the world's largest publisher of computer-related information. The group publishes 53 computer publications in 24 major countries. Nine million people read one or more of the group's publications each month. Members of the publication group include Argentina: *Computerworld Argentina*; Asia: *The Asian Computerworld*; Australia: *Computerworld Australia, Australian Micro Computerworld Magazine, Australian PC World and Directories*; Brazil: *DataNews, MicroMundo*; China: *China Computerworld*; Denmark: *Computerworld Danmark, MicroVerden*; Finland: *Mikro*; France: *Le Monde Informatique, Golden* (Apple), *OPC* (IBM); Germany: *Computerwoche, Microcomputerwelt, PC Welt, Software Market, CW Edition/Seminar, Computer Business, Commodore Magazine*; Italy: *Computerworld Italia*; Japan: *Computerworld Japan, Perso ComWorld*; Mexico: *Computerworld/Mexico, CompuMundo*; Netherlands: *CW Benelux, Micro/Info*; Norway: *Computerworld Norge, MikroData*; Saudi Arabia: *Saudi Computerworld*; Spain: *Computerworld España, MicroSistemas*; Sweden: *ComputerSweden, MikroDatorn, Min Hemdator, Svenska PC World*; United Kingdom: *Computer Management, Computer News, Computer Business Europe*; United States: *Computerworld, Hot CoCo, inCider, InfoWorld, Macworld, Micro Marketworld, PC World, Run, 73 Magazine, 80 Micro*
Printed in the United States of America.

3 MINUTE BACKUP*!

FAST FILE-BY-FILE PROTECTION!

Maynard's new state-of-the-art tape backup system can back up the average 10MB hard drive in just 3 minutes! Protect select files or back up your entire hard drive with a simple command. Offers unmatched efficiency and comes with our industry-leading 1-year warranty.
The MaynStream™ is available in 20MB, 27MB, and 60MB, and as an internal unit for the AT.
Compatible with IBM, Compaq, and NCR personal computers.†

*Actual time: 2 min/57 sec. Total files backed up: 376 consisting of 10,002,432 bytes. Computed on IBM-PC with 512K memory and one 10MB hard disk drive. Your actual back-up time may vary.

†IBM is a trademark of International Business Machines. Compaq is a trademark of Compaq Computer Corporation. NCR is a trademark of NCR Corporation.

MAYNSTREAM
TAPE BACKUP SYSTEM
BY MAYNARD ELECTRONICS

Maynard Electronics

Shaping Tomorrow's Technology

430 E. SEMORAN BLVD., CASSELBERRY, FL 32707

305/331-6402

Circle 98 on reader service card

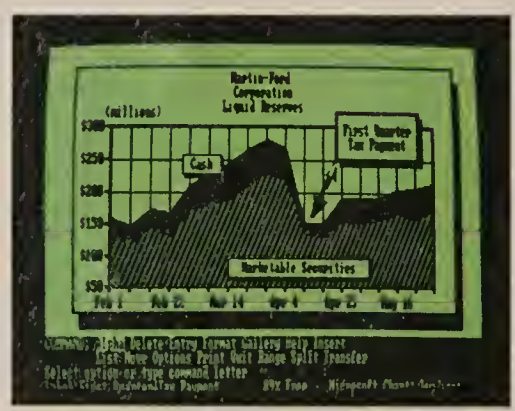
Quick. Who

New Microsoft® Chart. Nothing draws conclusions better. Chart gives your IBM® PC presentation-quality business graphics. So you can be sure everyone gets the picture. Quick.

Illustrate your point.

Microsoft Chart helps you set up the chart that most clearly displays your information. Because Chart gives you the freedom to do what you want. Quickly and easily.

Start by picking the chart that makes your point best: line, bar, area, pie, column, high-low, and scatter charts are shown right on the screen. You can see how your information looks in different charts, switching from one to the other on command.



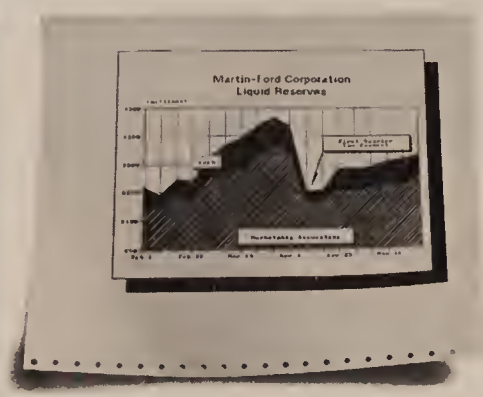


Chart it and print it in minutes.

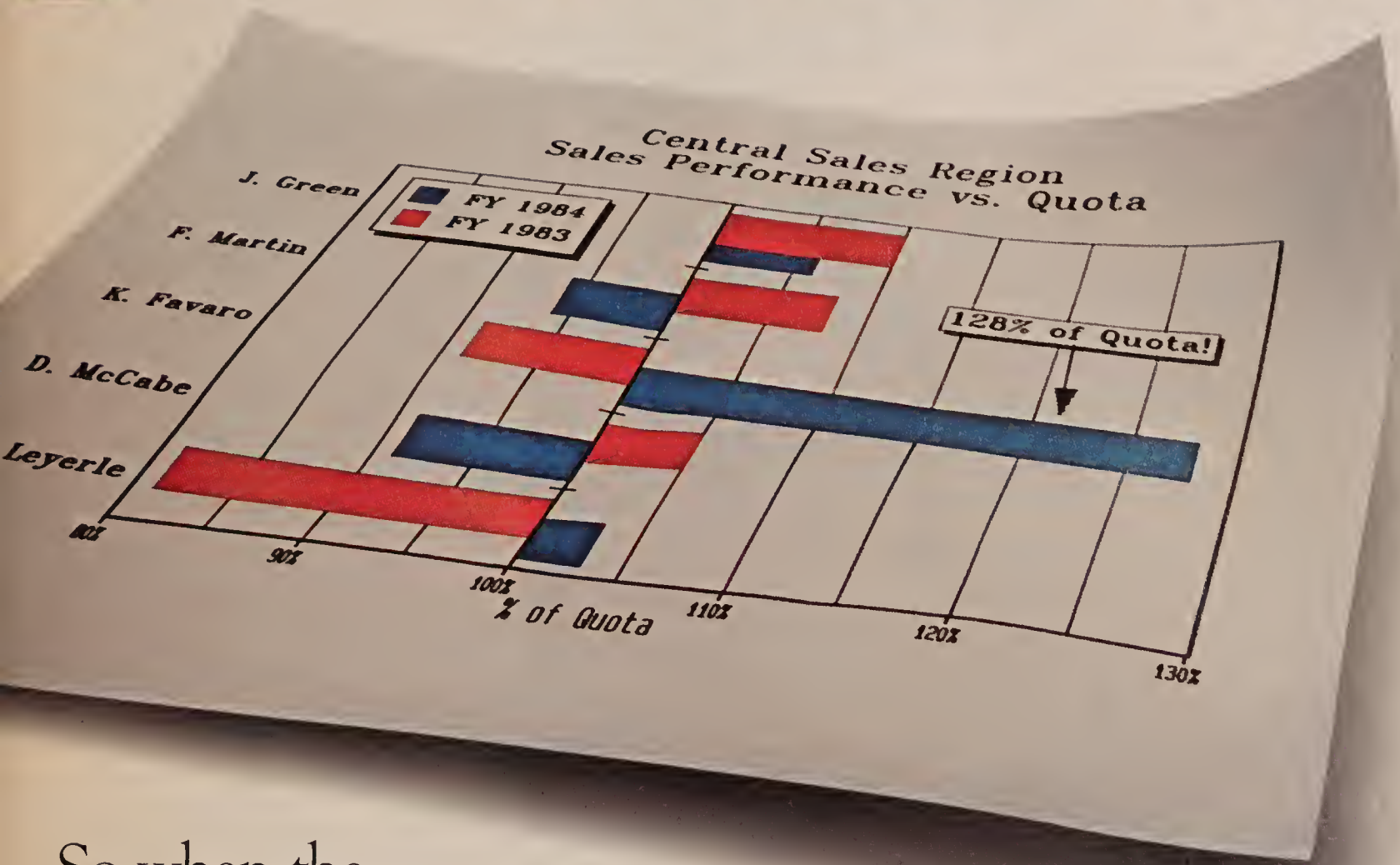
Then you can fine-tune the chart to get exactly what you want. Move any section. Position it, change its size, shape or highlight it. Your chart is displayed on the screen, so you can see how it looks with every change.

Like it? Print it. Chart works with over 20 printers and more than 10 color plotters.

Chart links with Microsoft Multiplan.®

Microsoft and Multiplan are registered trademarks and MS-DOS and The High Performance Software are trademarks of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. VisiCalc is a registered trademark of VisiCorp. dBASE II is a registered trademark of Ashton-Tate.

gets the bonus?



So when the numbers change, the charts change. Automatically. It also picks up information from Lotus™ 1-2-3,™ VisiCalc® and dBASE II.®

Small wonder Microsoft puts you on top of the charts. We designed the MS-DOS™ operating system that tells the IBM PC how to think. And our BASIC is the language spoken by nine out of ten microcomputers worldwide.

So if you want to get the picture, quick, call (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088. Ask for more information on Microsoft Chart. And the name of your nearest Microsoft dealer.

MICROSOFT®
The High Performance Software™

Introducing PC software the right way to do

IBM's new Personal Decision Series. A powerful team of business programs designed for exceptional flexibility.

There's rarely one best way of doing anything.

Rather, lots of very good ways; a reality that IBM's Personal Decision Series handily accommodates.

More than any software we know of, it gives you choices. You tailor it to your needs, instead of vice versa.

You begin with *Data Edition*, a program that not only manages huge amounts of information, but lets you take it from a surprising variety of sources: data banks, mainframes, even files created by other PC programs.

And you can retrieve your data in nearly any form you like, without a lot of headscratching. You can begin producing real work in a couple of hours.

Add *Reports+* and you can create your own style documents, pulling facts from up to 6 *Data* files at a time, in formats you can design, for applications you can invent.

Graphs gives you a choice of 13 graph styles, with over 20 variations. And you can update old graphs without

With IBM's new Personal Decision Series, you start with *Data Edition*, adding others, like *Reports+* or *Plans*, as you like.

For even more help, you can add *Appoint-*

based on the curious notion that things is any way you want to.

having to make new ones.

There's also *Plans+* for financial modeling and spreadsheets, and *Words* for putting your sentences, numbers and graphs all together.

The Personal Decision Series can even take information from a number of non-Series programs. So if you already have a favorite spreadsheet or writing program, you may still be able to use it.

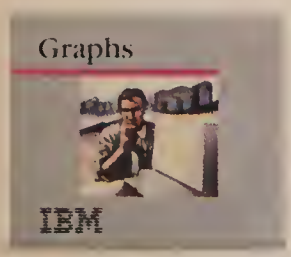
You can even use files from an IBM System/36 or System/370 computer, by adding an *Attachment/36* or */370 Edition*.

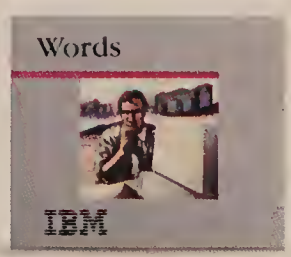
All of which is perfect for people who insist on doing things their way.

Do you know somebody like that?

To learn more, call an IBM marketing representative, or visit an IBM Product Center or authorized IBM PC dealer.

For the store nearest you, and a free brochure, call 800-447-4700. (In Alaska and Hawaii, 800-447-0890.)





ment Calendar; Client Time/Cost Accounting, and *Prospect Tracking Editions*.

Also, the Personal Decision Series works with data from IBM's new *Business Management Series*, a powerful family of accounting programs.

And ask about IBM Extended Support services, a way to get software updates and telephone assistance direct from IBM.

IBM®
Personal Computer Software

Little Tramp character licensed by Bubbles Inc., s.a.

Circle 830 on reader service card

"A clear winner."
—CREATIVE COMPUTING

"Perfect example of simplicity and integration."
—PC PRODUCTS MAGAZINE

"Sophisticated and attractively priced."
—INFOWORLD

SIMPLE.

SIMPLY POWERFUL.

It's true. PFS® has proven to the world that software can indeed be simple.

But on the other hand, there's Electric Desk™ from ALPHA® Software, which has proven that simple-to-use software can indeed be powerful.

That's because Electric Desk is a single integrated program that combines word processing, spreadsheet, file management with report writing, and communications. All on one disk.

So you not only get to do more work with one Electric Desk than several PFS's, you also get to do things that PFS simply can't. Like jump instantly from a letter to budget to customer list, over to a stock report and back, with just a couple of keystrokes.

Plus, Electric Desk lets you do something else that's remarkable—save money. Because for just $345.00* you get a complete IBM® PC/XT/AT version of Electric Desk with all capabilities included. That's far more computing power than PFS delivers for over $700.00.*

Which all goes to show, that when it comes to serious business software, it's not how simple you make it, it's how you make it simple. To try out Electric Desk for yourself, send $3.00 for a full function demo disk. Or call us at 1-800-451-1018 (in MA call 1-800-462-2016) for the name of the ALPHA Software Dealer nearest you.

Available for the IBM PC*jr.* for $295.00.

ALPHA®
SOFTWARE CORPORATION

30 B St., Burlington, MA 01803

*Based on manufacturers' suggested retail prices. Electric Desk is a trademark licensed to ALPHA Software Corp. by Electric Software, Inc. ALPHA Software Corp. is a registered trademark. PFS is a registered trademark of Software Publishing Corp. IBM is a registered trademark of International Business Machines Corp. © 1985 ALPHA Software Corp. Permission to publish quotes granted from respective publishers.

Circle 6 on reader service card

Software Piracy—One More Time

David Bunnell

Copy protection: balancing user convenience and software publishers' livelihoods

While having lunch with *InfoWorld* columnist John Dvorak recently, I began lamenting that my column was once again late and that I was having a hard time figuring out what to write about. Dvorak, noting that I hadn't written about software piracy for quite some time, suggested that I break down and do my "annual" piracy column.

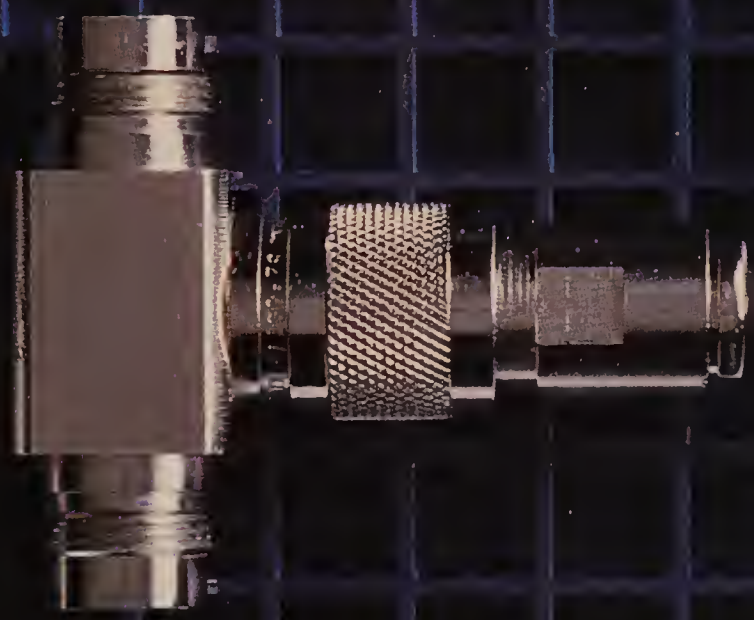
Initially, I resisted this idea, thinking that software piracy is a worn-out issue—computer writers have been pontificating about it for years with no visible impact. We all know it's a hot issue for software publishers, and there are always several opinions being aired, but nothing is ever accomplished or changed. It may be the one aspect of personal computing that is resistant to updates.

Software piracy appeared in the personal computing arena about ten years ago—almost immediately after Bill Gates shipped the first copy of Altair BASIC (also called MITS BASIC). Bill noticed that there were suddenly thousands of copies of Altair BASIC in use but only hundreds of actual sales; thus his anticipated royalties were not materializing. He took action in the form of an open letter to computer hobbyists, which was widely published and discussed. However, the now defunct California Computer Society was so irritated by Gates's accusation that most hobbyists steal software that they threatened a class action lawsuit.

One reason for the frequent copying of Gates's original BASIC was Altair's two-tier pricing policy. If you owned an Altair, you could buy BASIC at a reasonably low price, but if you owned a compatible (such as an IMSAI), the program cost four times as much. Most software publishers, pointing to the rampant copying of low-cost games, claim that price is not a factor and that people copy software regardless of its cost. However, publishers don't seem willing to back their postulations.

John Dvorak contends that publishers refrain from copy protecting their programs as a marketing

Direct PC to System 34/36/38 Connections Using Standard Twinax Cable



It's Easy With AST-5251/11™: Fast Hookup, File Transfer and Extra Capabilities

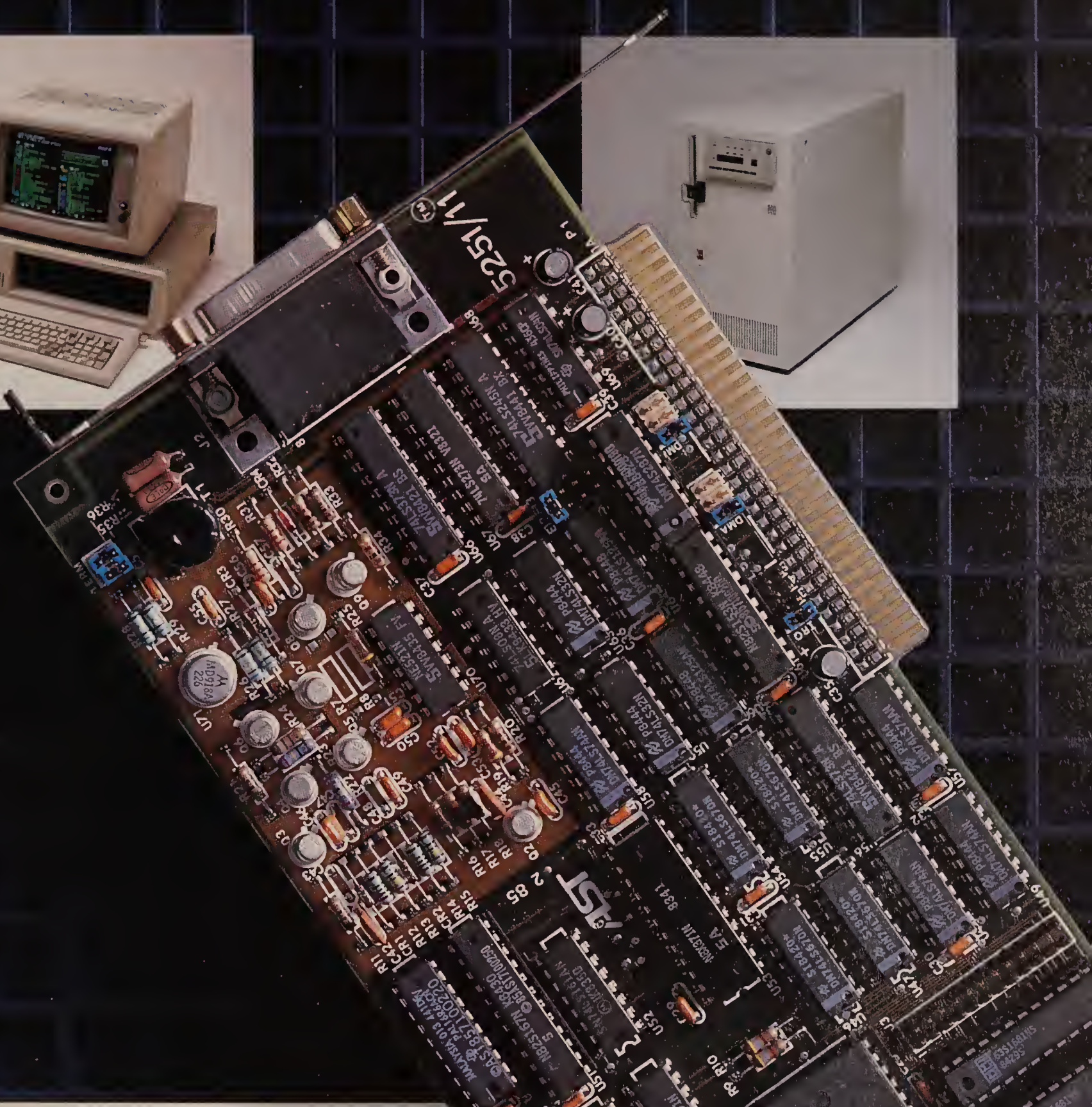
Standard Twinax Cable Support Makes Installation A Snap. AST-5251/11 and twinax connection means easy, cost effective direct cable attachment of your PC to your IBM® System 34/36/38—no expensive communications adapter necessary. Just plug our AST-5251/11 emulation board into your PC/AT/XT, portable or compatible and connect the twinax cable. With this complete hardware/software solution that's all it takes to use your PC just like a standard IBM 5251/11 display terminal.

File Transfer Is Only The Beginning. Use your PC as always, and emulate a Model 11 terminal—with extra capabilities—to access your powerful host minicomputer. Then transfer files bi-directionally between your host and PC, in a ready-to-use format.

Use Your Favorite PC Software. AST's file transfer support not only eliminates the burden and the errors of re-keying, it adds the ability to manipulate transferred data using your favorite PC software packages, like Lotus 1-2-3™ and WordStar.® And our Hot-Key support lets you conduct concurrent DOS and host sessions, while our applications program interface (API) makes integrating PC and host applications simple.

Even Greater Efficiency. For configuration flexibility, AST-5251/11 provides host-addressable 5256 printer support in a background mode, and can effectively utilize low-cost PC-compatible printers.

This complete package—from the leader in PC enhancement products—is available from your neighborhood computer store. So is our AST-5151/12™ for remote connections. See your dealer today, or call our Customer Information Center (714) 863-1333 Ext. 5249 for more information. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 (714) 863-1333 TWX: 753699ASTR UR.



KEY FEATURES

- *Plugs into PC/XT/AT and compatibles; connects to System 34/36/38 via twinax cable and supports cable thru.*
- *Emulates 5251-11, 5291, or 5292-1 display terminal.*
- *Provides host-addressable 5256 printer support (background mode) on PC-attached printer.*
- *Selectable DMA and I/O interrupt channels.*
- *Application program interface and bidirectional file transfer included.*
- *Complete package includes hardware, software, twinax cable assembly, and comprehensive user manuals.*
- *Supports fixed or hard disk.*
- *Hot-Key assist for concurrent host and PC sessions.*

AST RESEARCH INC.

AST-5251/11 and AST-5251/12 trademarks of AST Research, Inc. AST-5251/12 is a development of AST Research, Inc., and Software Systems, Inc., Jefferson City, MO. IBM registered trademark of International Business Machines Corp. WordStar registered trademark of MicroPro International Corp. Lotus and 1-2-3 trademark of Lotus Development Corp.

Circle 19 on reader service card

FOX & GELLER PRESENT
The Latest Products for
dBASE III
NEW
QUICKREPORT ™
dBASE Report Generator
• Prints *any kind* of report or form
• Up to *6 databases* per report!!
• Incredibly easy to use
• No programming required
QUICKCODE III ™
dBASE Program Generator
• Create CMD files *automatically*
• Data entry screens
• Data input error checking
• Computed fields & totals
• Link up to 8 databases!
Why write programs yourself?
Let QUICKCODE III do it!
dGRAPH III ™
dBASE Graphics System
• Pie, line, bar charts
• Printer, plotter, or CRT
• Many automatic features
dUTIL III ™
dBASE Program Utility
• Finds program errors
• Improves code
• Saves time
—Versions available for dBASE II—
INFORMATION HOTLINE
800-221-0156
FOX & GELLER
Fox & Geller, Inc. 604 Market St., Elmwood Park, N.J. 07407
dBASE II and dBASE III are trademarks of Ashton-Tate
QUICKCODE and QUICKCODE III are trademarks of Fox & Geller, Inc.
Circle 71 on reader service card

tactic. His theory is that most pirating is done by computer enthusiasts who—if they like the software—will recommend it to their friends or business associates and influence buying decisions. This concept is finally being tested, by Borland International and other software publishers.

And some manufacturers are driven by a tremendous respect for the user's convenience. Seymour Rubinstein and Glenn Haney cited that motivation when they announced that MicroPro was removing the copy protection from *WordStar 2000*.

A program that is not copy protected has definite ease-of-use advantages. Because, let's be honest, most copy protection schemes are a pain in the neck. It is hard to imagine that there could be a single PC user with a hard disk who hasn't been seriously inconvenienced by copy protection.

Generally, copy-protected software can be installed on a hard disk system fairly easily, but once you've transferred the program, you cannot start it without inserting the system disk into the floppy disk drive. This may seem trivial to software publishers or PC owners without hard disks, but consumers don't spend all that money on a hard disk to still be juggling floppy disks.

For example, I often use a Compaq-Plus with a hard disk at home in order to work in the evenings or on weekends. Despite the computer's portability, gathering up files, budget sheets, and disks can be a big production. So it is incredibly frustrating when I discover, after clearing table space, opening my computer, and plugging it in, that I have forgotten to bring along my Lotus master disk. The *1-2-3* budget files and *1-2-3* itself are on the hard disk, but without the master, the program won't boot up. My only alternative is to drive back to the office. Luckily, I don't live very far away.

I still have nightmares about the time I started to boot *Framework* and accidently inserted my *Symphony* master disk—it garbled my entire *Framework* directory. At that point, since my next major magazine project was on that directory, I considered calling Melvin Belli—but I didn't know who to sue, Lotus Development or Ashton-Tate.

Horror stories and frustrations aside, new ideas continue to surface. For instance, an organization of software publishers called ADAPSO, the Association of Data Processing Service Organizations, wants to establish a hardware-based system of copy protection. Under this plan a "key ring" would be plugged into the RS-232C serial port with a pass-through connection that would still allow you to use the port for other things. The key ring would contain keys to individual applications. This protection system would enable you to make as many backups as you wanted and load software onto a hard disk without bothering with a master floppy. To move to another computer, you would simply move the key ring.

A $39 training program can get your $3900 computer out of the closet

The computer is a wonderful invention. But the truth is that computers are not as easy to use as you've been told. In fact, a recent independent survey found out that 60% of computers in corporate America today see little or no use.

ATI thinks its skill-based training programs are the answer. For as little as $39.95, anyone can learn how to operate a computer in less than two hours—without attending a class or reading a technical manual.

Over 500,000 users have happily achieved computer literacy with ATI. In fact, ATI was voted the Educational Product of 1984 in a highly publicized survey. So, whether it's training for 1-2-3 dBASE III or getting started with your PC, look to ATI.

You can find ATI training programs at your nearby computer store or use the coupon below if your favorite program is out of stock.

Please rush me the following training programs:

$75.00—ATI TRAINING POWER™ PROGRAMS

- ☐ BPI General Accounting
- ☐ dBASE II
- ☐ dBASE III
- ☐ Easywriter II
- ☐ Framework
- ☐ Lotus 1-2-3
- ☐ MacCoach
- ☐ Microsoft Word
- ☐ MultiMate
- ☐ Multiplan
- ☐ Peachtree Accounting Series Specify: AR, AP, GL, IC, LM, SI
- ☐ Super Calc³
- ☐ Symphony
- ☐ TK!Solver
- ☐ WordStar

$39.95—SKILL BUILDER™ PROGRAMS

- ☐ How to Use your IBM PC
- ☐ How to Use your IBM PCjr
- ☐ How to Use your COMPAQ
- ☐ How to Use your TI
- ☐ Intro to Business SW
- ☐ Intro to Word Proc
- ☐ Applesoft BASIC
- ☐ BASIC
- ☐ CP/M
- ☐ The Home Accountant
- ☐ MS-DOS
- ☐ PC-DOS
- ☐ VisiCalc
- ☐ volkswriter deluxe

Please enclose the appropriate amount plus $2.50 shipping (CA add 6.5%)

Name _____ Phone ( ) _____

Street _____

City _____ State _____ Zip _____

My computer is a: _____

My computer uses: ☐ PC DOS ☐ MS DOS ☐ CP/M ☐ APPLE II CP/M ☐ APPLE IIe 80 col.

Mail order form to:
ATI
12638 Beatrice Street
Los Angeles, CA 90066

For rush order call:
(213) 823-1129
(800) 421-4827

ATI Money Back Guarantee: If you're not completely satisfied with how fast you learn with ATI Interactive Training Power Programs, simply return within 3 days for full purchase refund.

The following names are trademarks of the following companies: ATI Training Power and Skill Builder, of American Training International; CP/M, of Digital Research; PC-DOS, of IBM; WordStar, of Micropro; MS-DOS, Multiplan, Microsoft Word and BASIC, of Microsoft; dBASE III and Framework, of Ashton-Tate; SuperCalc³, of Sorcim; VisiCalc, of VisiCorp.; Lotus 1-2-3 and Symphony, of Lotus Development; COMPAQ, of COMPAQ; IBM PC and IBM PCjr, of IBM; TI Professional, of Texas Instruments; MultiMate, of MultiMate International; TK!Solver, of Software Arts; volkswriter, of Lifetree, Inc.; The Home Accountant of Arrays, Inc.

©1985 American Training International

ATI™ Training is our middle name.

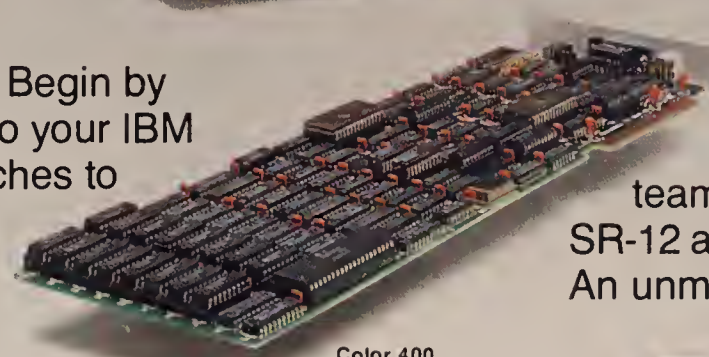
Circle 7 on reader service card

Princeton Graphic Systems and Sigma Designs team up to give you a brighter, sharper display.

SR-12 and Color 400. A brilliant combination for super-high resolution graphics and a crisp character display. For a brighter, sharper display with all your IBM PC-compatible software here's a team that can't be beat. The SR-12 super-high resolution RGB monitor from Princeton Graphic Systems and Color 400, the advanced color graphics adapter card from Sigma Designs.

SR-12

Snap in Color 400. Begin by snapping Color 400 in to your IBM PC, XT, or AT. No switches to set. No cables to confuse. Color 400 gives you a razor sharp 640 x 400 display. It automatically *doubles* the number of lines on standard 200 line software. Watch your graphics come to life. Enjoy fully formed, monochrome-quality characters in text mode. Just turn on your PC and tune in a whole new world of vibrant color.


Color 400

COLOR 400

Turn on SR-12 for the impressive results. The SR-12 displays your Color 400 image with unmatched clarity and brilliant color. Because the SR-12 combines a .31mm dot pitch tube and a non-glare screen with an incredible 640 x 400 non-interlaced resolution, you get a flickerless image that's as crisp and clean as a personal computer can produce.

See how impressive this state-of-the art image can be on your own PC system. Visit your local retailer today and ask about this new color graphics team. Princeton Graphic System's SR-12 and Sigma Designs' Color 400. An unmatched, brilliant combination.

SIGMA DESIGNS

SIGMA DESIGNS, INC., 2023 O'Toole Avenue, San Jose, CA 95131
(408) 943-9480 Telex: 171240

PRINCETON™
GRAPHIC SYSTEMS
AN INTELLIGENT SYSTEMS COMPANY

Princeton Graphic Systems, 601 Ewing Street, Bldg. A, Princeton, N.J. 08540
(609) 683-1660, Telex: 821402 PGS PRIN, **(800) 221-1490** Ext. 206

IBM PC, PC XT, and PC AT are registered trademarks of International Business Machines, Inc.

Circle 225 on reader service card

IT DOESN'T HAVE TO BE COMPLICATED TO BE POWERFUL.

The pen has always been one of the most powerful ways to exchange information and ideas. Yet it's one of the least complicated of all tools.

PFS®:WRITE is a word processing software program that's powerful enough to meet all your business writing needs. Yet it's surprisingly uncomplicated.

And amazingly easy to learn.

WRITE was designed for people without computer experience. So all instructions are easy to understand. And you can be productive quickly.

With just a few keystrokes, you can make insertions and deletions, create bold face type, even move whole blocks of text.

And WRITE's screen is designed to resemble a standard sheet of paper. So you'll always know what your document will look like *before* you print.

Since it's integrated with the PFS Family of Software, WRITE also gives you the power to produce personalized form letters when used with PFS:FILE. And with PFS:GRAPH, you can produce a variety of graphs within the body of any document.

PFS:PROOF* is the perfect companion program to PFS:WRITE. PROOF checks WRITE documents for spelling, typographical errors, irregular capitalization and repeated words. And makes the necessary corrections for you.

All with just the touch of a key.

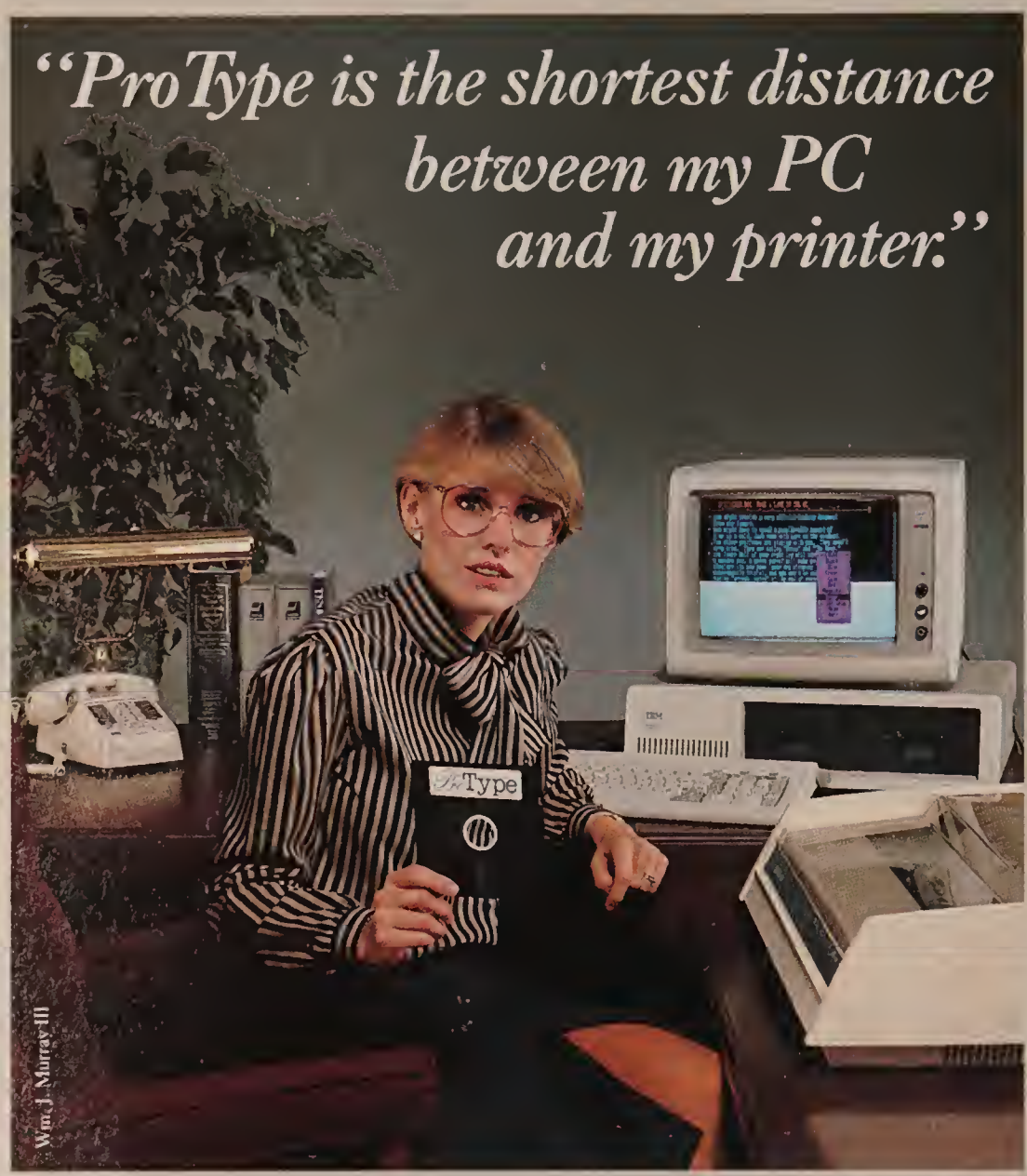
You can even add words beyond PROOF's 100,000 word dictionary if you need to.

PFS: It's the powerful software that's simple to learn. It's the power of simplicity.

See your computer dealer for more details.

PFS SOFTWARE
THE POWER OF SIMPLICITY

PFS:WRITE currently works on IBM® and equivalent personal computer systems, Apple® IIe and Panasonic. *PFS:PROOF will be available for IBM and equivalent personal computers in June. © Software Publishing Corporation.



What is ProType?

The only memory resident software that provides instant access to a printer. ProType is fast and easy to use — it's completely menu-driven and has an on-line tutorial.

When can you use ProType?

Right in the middle of other software programs and with any make or model printer.

What can you do with ProType?

Type . . .
Print text on a line-by-line basis — just like a memory-typewriter. The Typewriter Mode is great for addressing envelopes.

Compose . . .
Type, edit, and print a short letter or memo using common word processing commands.

Set printer characteristics . . .
Take full advantage of your printer's capabilities. From the Font Menu, you can select whatever type size and style your printer will support. You can even print your spreadsheet in bold-green-condensed-italics!

Fill in your office forms . . .
Have instant access to a file of your own office forms. Select the form from the Forms Menu, fill it out on-screen, put the blank form in your printer, and print it out — no mistakes!

Cut & Paste . . .
Import text from your underlying program — an address from a database, for example — and instantly print it out.

ProType™

from Photon Software

for IBM PC's, XT's, AT's & compatibles

$119.95

ask your dealer or order direct:

PHOTON SOFTWARE
(800) 426-2675
(206) 451-8272
P.O. Box 1408
Bellevue, WA 98009

Circle 575 on reader service card

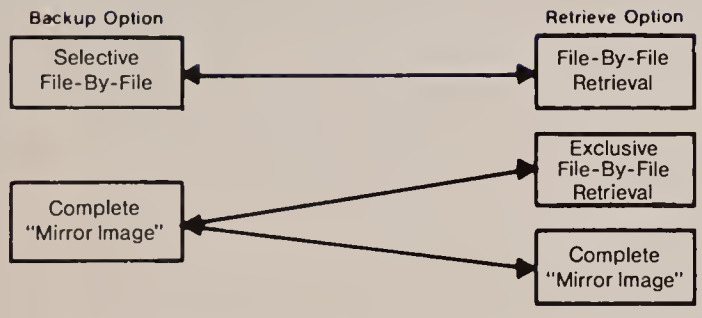
There is a certain logic to the ADAPSO proposal once you assume that copy protection is necessary. However, the president of a major software company has already complained that ADAPSO's intention is to limit the amount of software on the market and protect the high price of software—making it a very elaborate price-fixing conspiracy.

According to the research firm Future Computing, 50 percent of all business software is unauthorized, and every four unauthorized copies represent one lost sale. They estimate that piracy cost software publishers $600 million in lost revenues in 1984. Thus, you might think that the copy protection movement is driven solely by the software publishers' self-interest. However, Mitch Kapor, chairman of Lotus Development and an outspoken proponent of copy protection, for one, seems completely sincere in his desire and efforts to find a solution to the piracy problem that won't inconvenience end users.

You have to have some sympathy for the notion that programmers, like writers and musicians, have a right to control and benefit from the distribution of their work. But copy protection may be destined to remain one of those ethical gray areas about which nobody will ever agree. Until a mutually beneficial arrangement is reached between the publishers and the users, at least Dvorak and I will always have a column topic when we really need one.

EVEREX
EVER FOR EXCELLENCE

Innovative Backup and Hard Disk Drive Systems For Your IBM PC, XT and AT



The Standard of Excellence in Backup Software

- Revolutionary Everex Backup systems give you the backup/retrieve flexibility you want while saving you hours of time. You can backup your hard disk drive in minutes with a fast "mirror image," then retrieve this information either file-by-file or the entire hard disk image.
- High speed backup/retrieve—up to 5MB per minute.
- Menu Driven software includes the largest selection of file selectable options—choose from name, date, time interval, global, qualifier and more.
- Advanced installation program automatically configures the optimal backup/retrieve speed with your hard disk drive.

The Leader in External Expansion Systems

- All external systems are available with any combination of Everex Backup and Hard Disk Drive systems.
- Slimline systems include one short and three long expansion slots for adding more accessory boards.
- Half-Size system includes four long expansion slots.
- Full-Size system (looks like your PC) includes eight long expansion slots.
- External systems include one high quality, round shielded cable.

The Total Solution For Backup That Plugs Right Into Your Computer

- A wide selection of backup solutions with the price and performance to meet your needs:
- The EXCEL 4500, 45 and 60 MB high performance ¼-inch Streaming Tape systems, the EXCEL 200, 20 MB Cassette system and the EXCEL 10 MB Floppy Tape system.
- Space-saving half height units with single board controller.
- Combine with Everex hard disk drives for lower cost and higher performance.
- Unique "piggyback" power supplies ensure dependable operation and save space.

Visit your local Everex dealer today and ask to see Everex products in action. For the name of your nearest Everex dealer, please call (415) 498-1111.

Imagineering Ultimo, Australia TLX: 74349 IMAGIN AA
Microage Distribution Ltd. London, England TLX: 881 3241 WONGS G
Feeder Paris, France TLX: 4413241 FEEDER
Automated Office Systems Hout Bay, South Africa 2721-70-8091
Survex, 1027 Speers Road, Oakville, Ontario Canada L6L-2X5, 416-842-6093
Pride Computers, 102-8167 Main Street, Vancouver, British Columbia, V5X 3L2, 604-321-5690

IBM, PC, XT and AT are registered trademarks of International Business Machines Corporation.
EXCEL is a trademark of Everex Systems Inc.

EVEREX
EVER for EXcellence

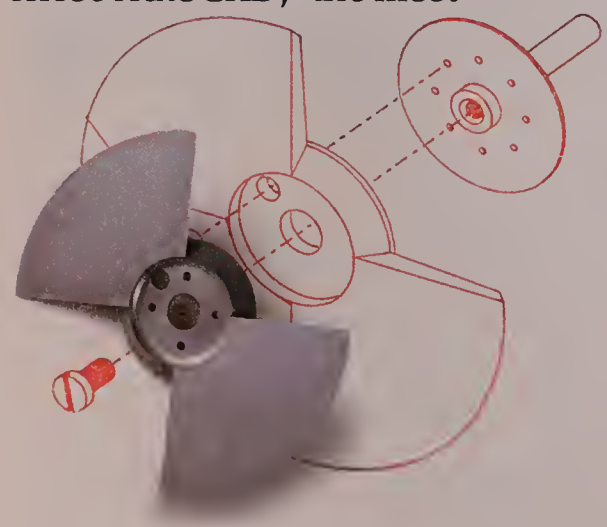
Address: 47777 Warm Springs Blvd., Fremont, CA 94539 (415) 498-1111.

Dealer Hotline (800) 821-0806 · In CA (800) 821-0807

Circle 699 on reader service card

Picture this on a $2

With movie budgets in the tens of millions, and television production costs soaring with every day of filming, the professionals in the entertainment industry demand the best of tools. When Ultracam Incorporated set out to design Ultracam™ K35, a new top-of-the-line $200,000 movie camera, they knew that their design tool needed to be as professional as the camera they were designing. That's why they chose AutoCAD,™ the most



widely used computer-aided design and drafting tool in the world today.

Mainframe CAD Capability at 5% of the Price

If you have an IBM PC, PC/XT, PC/AT, NEC, DEC, TI, Tandy, Wang, or one of over 30 desktop computers AutoCAD supports, you already own the most expensive part of a CAD system. Add AutoCAD for only $2500 more, and you can have the power of CAD on your desktop at a price you can afford. With a pointing device and a plotter (the choice is yours, we support over 50 popular peripherals), you can assemble a complete CAD workstation for less than $10,000.

Once you've installed AutoCAD on your computer, you'll have a tool at your fingertips which removes the drudgery from designing. You can draw, modify, copy, and scale objects, or define commonly used parts and insert them anywhere in your drawing. You can fill an area with any of our 38 predefined patterns, or make up your own. Use an unlimited number of layers, like overlays in drafting, and automatically dimension distances, angles, radii and diameters with full ANSI standard dimensioning. You can even do three-dimensional visualization with AutoCAD.

Quick to Learn, Easy to Use

The beauty of AutoCAD is that you need no prior knowledge of computers. Even if you've never seen a CAD system, you'll pick it up in a matter of days,

and feel comfortable within a week.

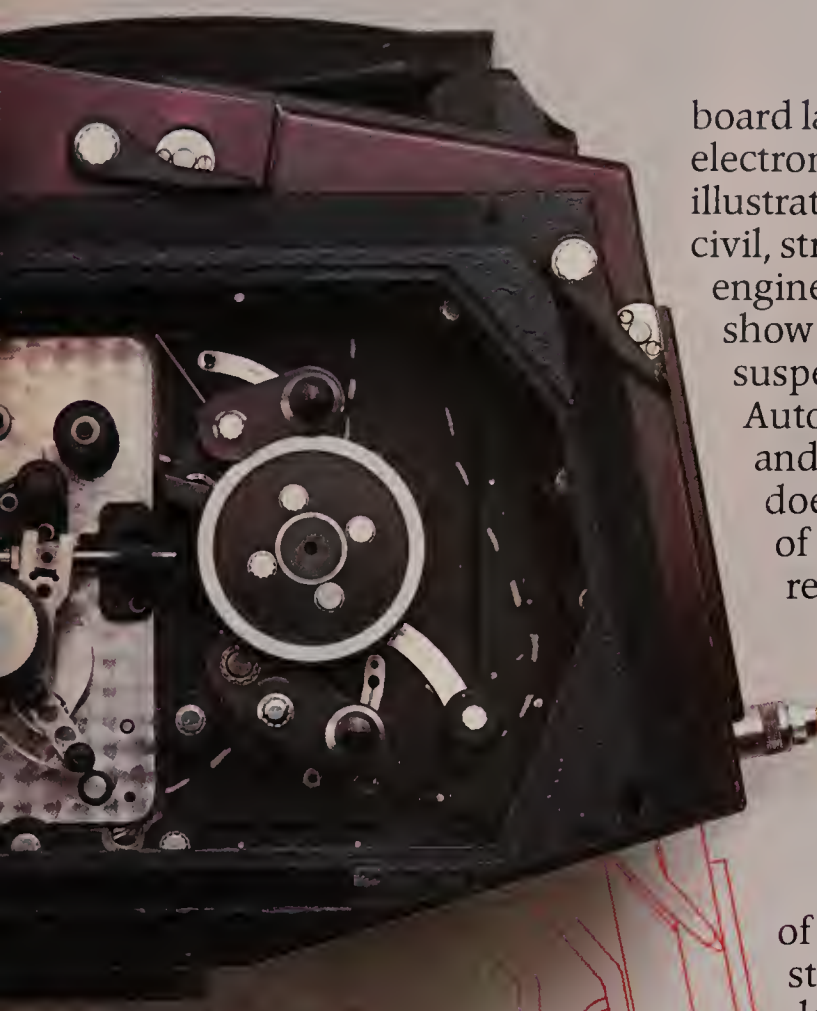
Sound to good to be true? Simple pop-up menus point you in the right direction. You can also easily create your own menus. On-line HELP keeps you on track.

Sailboats, Landscapes, and Contact Lenses

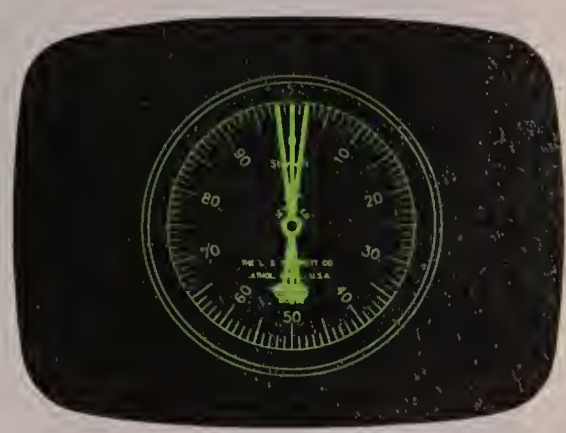
Tens of thousands of AutoCAD users are creating PC

Mechanical/technical illustrations provided by Maintenance Troubleshooting Products Division, Delaware.

,500 CAD program.

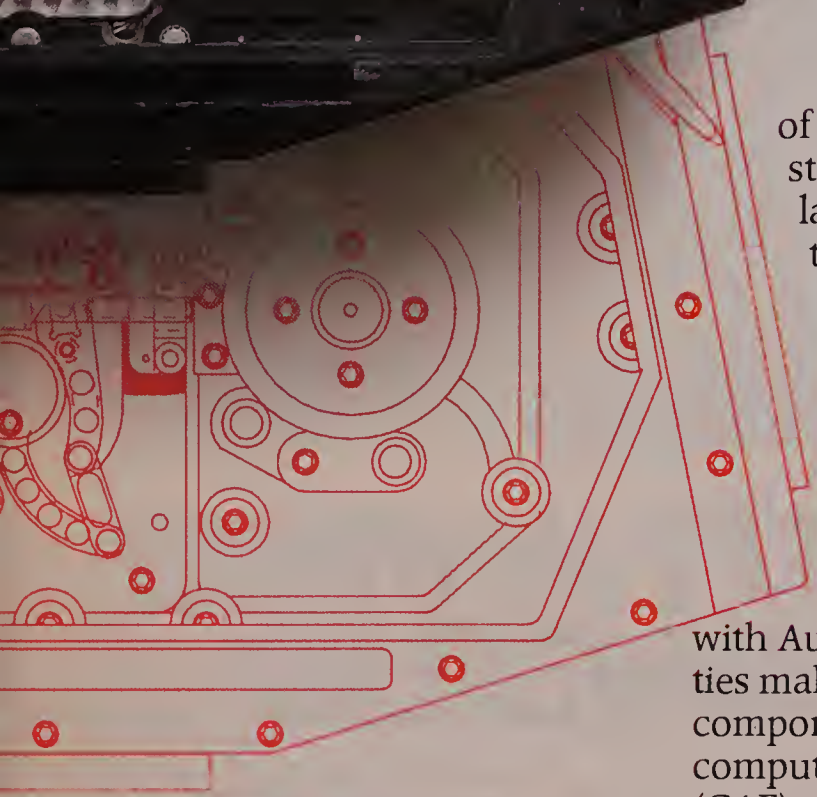


board layouts, elevator designs, electronic schematics, technical illustrations, architectural designs, civil, structural, mechanical engineering drawings, trade show floor plans, and race car suspension designs. Since AutoCAD is general-purpose and user-customizable, it doesn't matter what type of drafting your work requires.



Technical illustration is a snap.

Camera designs provided courtesy of Ultracam Incorporated.



The Heart of Your CAE System

Drawings are only part of the story. Pre-defined standard symbols, translators to allow AutoCAD to exchange drawings with mainframe CAD systems, data base analysis programs for bill of material lists, job costing and drawing distribution by telephone are only some of the capabilities available with AutoCAD. These capabilities make AutoCAD the central component in your desktop computer-aided engineering (CAE) system.

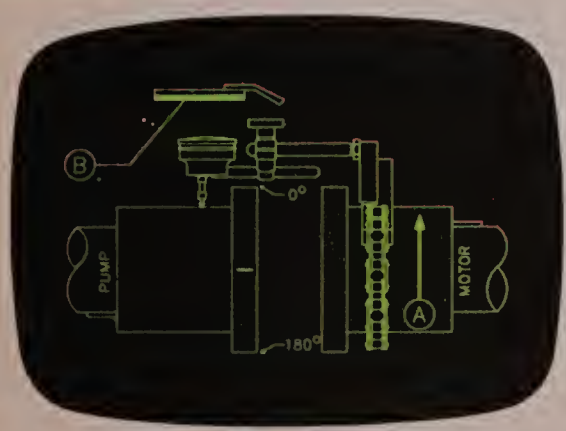
Whether you're in a two-person shop or a two-billion dollar company, you'll find that AutoCAD pays for itself in just a few months.

In the future, AutoCAD will run on newer, more powerful computers as they become available—so that you can be sure your investment in creating drawings and training staff won't be wasted.

Powerful New Capabilities

Call or write us today for the name of the dealer nearest you and a demonstration of the latest in AutoCAD capabilities, including polylines, curves, and 3D visualization with hidden line removal. Also ask about other cost-effective Autodesk products: AE/CADD™ and CAD/camera.™

AutoCAD will save you time and money.



Mechanical drawings with accuracy and speed.

AUTODESK, INC.
2320 MARINSHIP WAY
SAUSALITO, CA 94965
(415) 331-0356
or (800) 443-0100 EXT. 406
TELEX 275946 ACAD UD

Ultracam K35 is a trademark of Ultracam Incorporated. AutoCAD, CAD/camera and AE/CADD are trademarks of Autodesk Inc.

Circle 28 on reader service card

A NUMERICAL CONCEPT NO OTHER MONITOR CAN COMPREHEND.

As sophisticated as they are, you'd think monitor companies could solve a simple problem: keeping customers happy.

Fortunately, Amdek can. With the longest warranty in the industry. Namely, two years on all parts and labor. And three years on the CRT.

Even simpler, our warranty applies to every monitor we make, from our new Color Series to our amazingly popular Video Series.

And Amdek's own trained technicians make repairs quick and professional.

So when you're shopping for a monitor, look at the quality Amdek guarantees you, years after you leave the store.

According to our figures, it really adds up.

AMDEK® MONITORS

Amdek Corp., 2201 Lively Blvd., Elk Grove Village, IL 60007, 312/595-6890, Telex 280803

© 1985 Amdek Corp

Circle 204 on reader service card

Encyclopedia Electronica

Eric Brown

This month PC World explores the universe of on-line data bases—and takes H. G. Wells along for the ride.

I want to suggest that something which for a time I shall call a World Encylopedia is the means whereby we can . . . bring all the scattered and ineffective mental wealth of our world into something like a common understanding. . . . This World Encyclopedia would be the mental background of every intelligent man in the world. It would be alive and growing and changing continually under revision, extension, and replacement from the original thinkers in the world everywhere.
—H. G. Wells (1936)

H. G. Wells never owned a modem, yet he prophesied to a great degree the impact of the vast stores of knowledge available through on-line services. Not only does the sum of on-line information far surpass that which can be found in a traditional library, but the information can be searched for in new and unique ways. By virtue of its powers of selection, the PC can be a solution rather than a contributor to the problem of information overload.

For many telecommunicators, the on-line world ends after CompuServe and The Source. While those services provide a wealth of information as well as entertainment, banking, and shopping services, their combined data accounts for only a fraction of the information that is accessible by modem. Electronic libraries dedicated to the professions have been around for decades, serving a small audience of professionals tuned into dumb terminals. However, with the sudden arrival of microcomputers, on-line data base services have blossomed and are increasingly relied on as necessities.

As the demand for fresh data increases, the on-line retrieval business is turning into a $2 billion a year industry, growing at a rate of 35 percent annually. Most data bases consist of bibliographic abstracts of thousands of journals from around the world. Yet the trend is toward full text data bases that provide the desired information without the extra step of ordering and waiting for the mail.

Already the text available is staggering, and the novice searcher can be easily over-

Introducing Quadnet.™ The family of four LAN systems that can grow with you.

The family tie.

Each member of the Quadnet family of local area network systems has its own unique characteristics. Yet all four share one family trait. The same network software.

That means you can start with the LAN system that suits your needs today. And upgrade tomorrow without having to learn a whole new set of commands. It's the only LAN system for IBM PCs, XTs and compatibles that you won't outgrow.

Making the right match.

If you're not sure which Quadnet LAN system is right for you, your Quadram dealer and our SelectNet™ software can help. This easy-to-use software will ask you a variety of questions about your planned applications, number of users, operating system, and more. Then SelectNet will recommend the ideal Quadnet match.

Quadnet comes with its own powerful multi-user operating system. Perfectly compatible with PC-DOS, Quadnet software lets you keep your current software and add on exciting multi-user packages. And while some systems limit each user to about 360K worth of data (just enough for one floppy disk), Quadnet lets you segment your hard disk any way you like.

When you're ready to order, all the accessories are pre-packaged so you're sure to get everything you need to get your Quadnet system up and running. The master package includes hardware, software and documentation. A workstation kit contains hardware for one workstation. And the cabling kit comes complete in three workstation increments.

Quadram Quality.

Insist on the Quadram name. It's your assurance that you're getting a quality product from an established and reliable company. Ask your dealer about Quadram. We don't make personal computers, we make them better.

QUADRAM QUALITY™

QUADRAM™
An Intelligent Systems Company

4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

INTERNATIONAL OFFICES
Interquadram Ltd. 442 Bath Road, Slough, England SL1 6BB Tel 6286-63865 Tlx 847155 Auriema G **Interquadram GmbH** Fasanenweg 7, 6092 Kelsterbach, West Germany Tel 6107-3089 Tlx 417770 Seva G **Interquadram s.a.r.l.** 41, Rue Ybry, 92522 Neuilly Tel 758-1240 Tlx 630842 Iso Bur **Chevco Computing** 6581 Kitimat Road, Mississauga, Ontario, Canada L5N-2X5 Tel 416-821-7600

IBM® PC, XT are registered trademarks of International Business Machines Corporation.

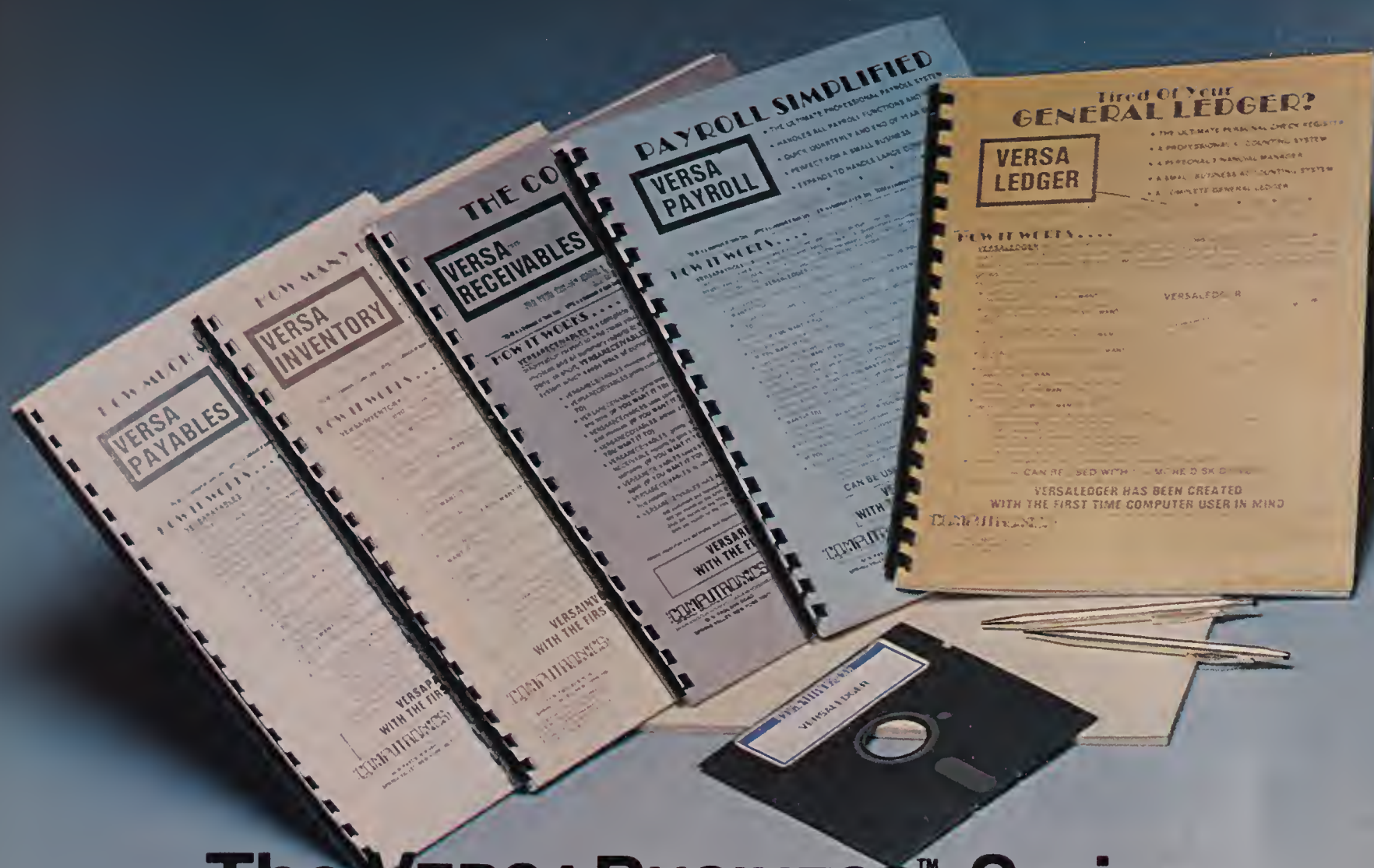
Wordstar is a registered trademark of Micropro International Corporation

© Copyright 1984 Quadram Corporation. All Rights Reserved.

Circle 195 on reader service card

Introducing the Most Powerful Business Software Ever!

FOR YOUR TRS-80 • IBM • APPLE • KAYPRO • COMMODORE 64 • MSDOS OR CP/M COMPUTER*



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ $99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ $99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, invenfory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for $25 each, credited toward a later purchase of that module.
All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

To Order:
Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- add $3 for shipping in UPS areas
- add $4 for C.O.D. or non-UPS areas
- add $5 to CANADA or MEXICO
- add proper postage elsewhere

DEALER INQUIRIES WELCOME
All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS INC
50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

*The VersaBusiness Series is available for TRS-80 · IBM · APPLE · KAYPRO · COMMODORE 64 · OSBORNE · XEROX · TELEVIDEO · SANYO · ZENITH · NEC · DEC · TI · EPSON · MORROW MICRO DECISION · NORTHSTAR · MSDOS and CP/M computers with 8" disk drives (Computer names are tradenames and/or trademarks of their respective manufacturers).

Circle 891 on reader service card

Time Is Money

PICO Will Save You Both

Get the competitive edge with PICO, the 1st non-technical publication about laptop computers. PICO will help you gain more efficient use of your time...

—You'll learn how other successful businesspeople increase their productivity with on-the-go wordprocessing and spreadsheets.

—You'll find out how to have at-your-fingertip access to figures, quotes, scientific and engineering data—instantly, no matter where you are.

—You'll learn about systems which let you place orders, send and receive messages and correspondence and update your schedule while away from the office.

—You'll learn more about what portables can do for you with PICO's reviews, buyer's guide, application stories, ads and helpful columns. Gain the competitive edge today. Order Now....

PICO
The Briefcase Computer Report

To subscribe:
Call 1-800-227-1053
Or mail in this completed form to:
PICO
22 Daniels Rd.
Fairfield, NJ 07006

YES! Time is money.

☐ Enter my subscription to PICO—*The Briefcase Computer Report*, 12 monthly issues for ONLY $19.97.
☐ Check enclosed ☐ Bill me
☐ MC ☐ VISA ☐ AE
Exp. date_____
Card no._____
Name_____
Address_____
City_____
State_____ZIP_____
755131

Circle 797 on reader service card

whelmed. In "Tapping Into On-Line Data Bases," Chris Yalonis and Anthony Padgett provide an overview of available services and data bases and lead you through the steps to going on line for the first time.

One offshoot growth industry of the on-line world can be found in software and services that make searching easier. In the "Review" section, Jeremy Joan Hewes takes a look at gateway systems—on-line services and PC software that act as intermediary guides to other services.

The key to successful searching lies in mastering the sophisticated search commands provided by the various services. In "On-Line Search Strategies," Barbara Newlin shows how to develop a sound search strategy and provides helpful tips that work on all the major on-line data bases.

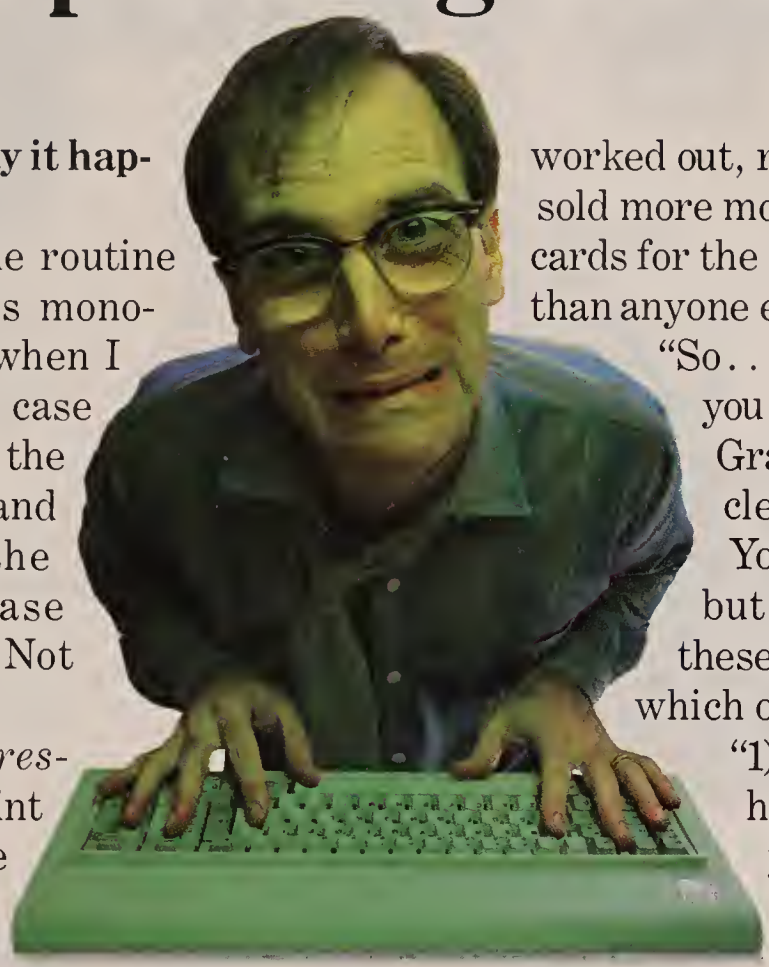
Finally, Lisa Stahr describes another side of the on-line world: teleconferencing. Companies large and small are finding that meeting by modem can save on travel, postage, and phone costs and provide insights that were never possible with a weekend spent at the Dallas Hilton.

Compared to traditional libraries, on-line data bases have one major drawback: Although they contain an estimated 90 percent of everything published in the last ten years, they carry little material written before that. However, the libraries of the world are now being scanned with optical character recognition (OCR) devices and their contents placed on line. Eventually the sum total of the world's past knowledge will be available through the modem, and H. G. Wells's dream of a World Encyclopedia will come true. Whether it will lead to a "common understanding" is still a matter for conjecture.

The on-line retrieval business is turning into a $2 billion a year industry, growing at a rate of 35 percent annually.

Eric Brown is an Associate Editor of PC World.

If you don't have a Hercules Graphics Card, you could end up looking like this:



"I know, because one day it happened to me . . .

"I was running some routine tests on a non-Hercules monochrome graphics card when I was struck by a severe case of *low resolutionitis*. I'm the president of Hercules and that's me exhibiting the symptoms of the disease in its advanced stages. Not a pretty sight, is it?

"What causes *low resolutionitis?* Experts point to ordinary monochrome graphics cards with coarse, hard-to-read graphics. A bad case of eyestrain may develop if action is not taken immediately.

"Fortunately for me, a Hercules Graphics Card was nearby. A quick change brought soothing 720 x 348 graphics. That's twice the resolution of ordinary 640 x 200 graphics cards.

"Which means better graphics for Lotus™ 1-2-3™, Symphony™, Framework™, pfs:Graph®, Microsoft® Chart and Word, SuperCalc3®, AutoCad™, and dozens of other programs.

"Including Microsoft Flight Simulator, now Hercules compatible!

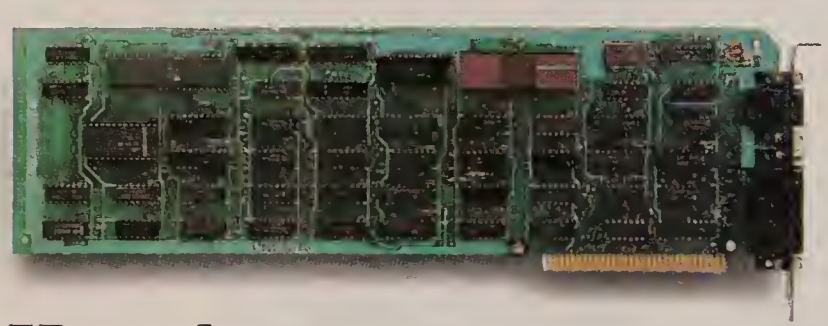
"Oh, and don't forget that a parallel printer port is standard on the Hercules Graphics Card, not an extra cost option.

"Now, if you're worried about buying a new product that hasn't had all the bugs worked out, relax. Hercules has sold more monochrome graphics cards for the IBM® PC,XT™ and AT™ than anyone else in the world.

"So . . . you're convinced that you should buy a Hercules Graphics Card. Now, steer clear of cheap imitations. You may save a few bucks, but you won't get all of these five essential features which only Hercules has:

"1) A safety switch that helps prevent damage to your monitor, 2) the ability to keep a Hercules Color Card in your system, 3) the ability to use the PC's BASIC to do graphics, 4) a Hercules designed chip that eliminates 30% of the parts that can go wrong, and 5) a two year warranty, because we think reliability is something you should deliver and not just talk about."

"Call **1-800-532-0600 Ext 401** for the name of the Hercules dealer nearest you and we'll rush you our free info kit.



Hercules. We're strong on graphics.

Address: 2550 Ninth St., Berkeley, CA 94710 Ph: 540-6000 Telex: 754063 **Trademark/Owners:** Hercules/Hercules Computer Tech; IBM,XT,AT/IBM; Lotus 1-2-3, Symphony/Lotus Development; Framework/Ashton-Tate; Microsoft/Microsoft; pfs:Graph/Software Publishing; SuperCalc 3/Sorcim-IUS; AutoCad/AutoDesk.

Circle 77 on reader service card

What's an all-sta
doing with a da

S. R., Sales,
Sporting Goods

"Cornerstone lets me use the full power of my personal computer."

Until now, unless you had time to learn computer programming, you were unable to realize the full potential of your personal computer.

That's why we created Cornerstone,™ the first sophisticated database system specifically designed for the non-programmer. Because whether you're a sales manager, wine merchant or financial analyst, you can't afford to waste time learning complicated software.

And Cornerstone isn't one of those lightweight systems that handles only a few simple jobs. On the contrary, it's a full-featured relational database system that can help you solve the wide range of information management problems you face every day.

"I use it to keep track of my customers."

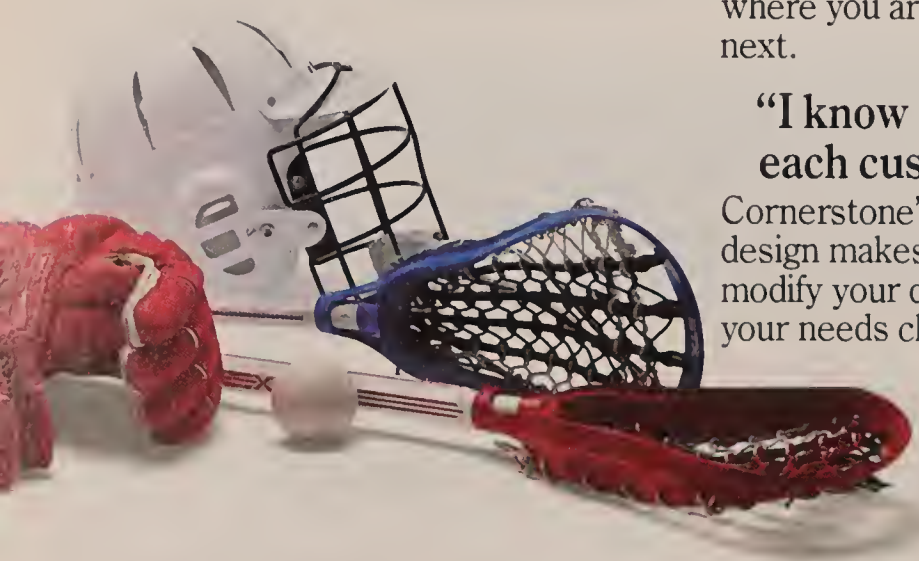
Keeping in touch with customers is critical in every business. Cornerstone gives you a fast, efficient way to do it.

For example, our sales manager started by building a database of his customers. Then he used it to organize his sales calls, with Cornerstone reminding him who to contact and when. Planning his monthly trip to Seattle now takes just seconds.

You'll be able to build your own database easily with Cornerstone. Our *Beginner's Guide* and *On-Screen Tutorial* teach you everything you need to get started in ten easy lessons. To set up a database, you just fill out a form on the screen by answering a series of simple questions. And if there's any doubt about what to do next, our unique Help and Options keys always explain where you are and what to type next.

"I know exactly what each customer wants."

Cornerstone's flexible design makes it easy to modify your database as your needs change.



Cornerstone is a trademark of Infocom, Inc.
IBM is a registered trademark of International Business Machines Corporation.
1-2-3 is a trademark of Lotus Development Corporation. Tandy is a registered trademark of Tandy Corporation.
PFS is a registered trademark of Software Publishing Corporation. dBase II is a registered trademark of Ashton-Tate.

Circle 949 on reader service card

r sales manager tabase system?

Our salesman, for example, added detailed notes about each of his customers to the database. So now, whether it's a special order for lacrosse equipment or the birthday of a key buyer, he has all the information at his fingertips.

Unlike other systems, with Cornerstone you won't have to decide in advance how much space you'll need for any item in your database. Cornerstone automatically makes room for a second phone number, an additional address, or even several pages of notes.

"Now I'm on top of my orders."

Business people often need to use the same information in different ways. Because Cornerstone is a full-featured relational database, you only type in information once, but you can use it in as many ways as you want.

For instance, when our sales manager takes an order, Cornerstone automatically fills in the customer's address, enters the price for each item, totals the sales and even applies the appropriate discount. Cornerstone can also keep a running summary of orders by customer and region.

"I can prepare my reports in seconds."

Providing information to others is an essential part of every professional's job. With Cornerstone's built-in report writer, you can give people the information they want, the way they want it. Our sales manager easily creates monthly reports on everything from sales projections to evaluations of key accounts.

With Cornerstone, you can produce reports in seconds—even when it requires information from different files. You'll be able to organize information the way you want it, make calculations and add notes. And then print your reports with just a few keystrokes.

Cornerstone is also designed to exchange information with many word processors and spreadsheets like 1-2-3.™ And you can easily convert existing PFS®:File and dBase II® files to Cornerstone.

Cornerstone is a different kind of database system. Created by a company committed to eliminating the barriers between computers and people. But to fully appreciate how different Cornerstone really is, you have to try it. In no time at all, you, like our sales manager, will be using Cornerstone for things you would never have tried before.

Cornerstone is now available for the IBM® PC, PC XT,™ PC AT™ and compatibles, and soon for the Tandy® 1000, 1200 HD and 2000. Suggested retail price $495.

For a free demo disk and brochure, call 617-574-0644. Or write to Dept. D, Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138.

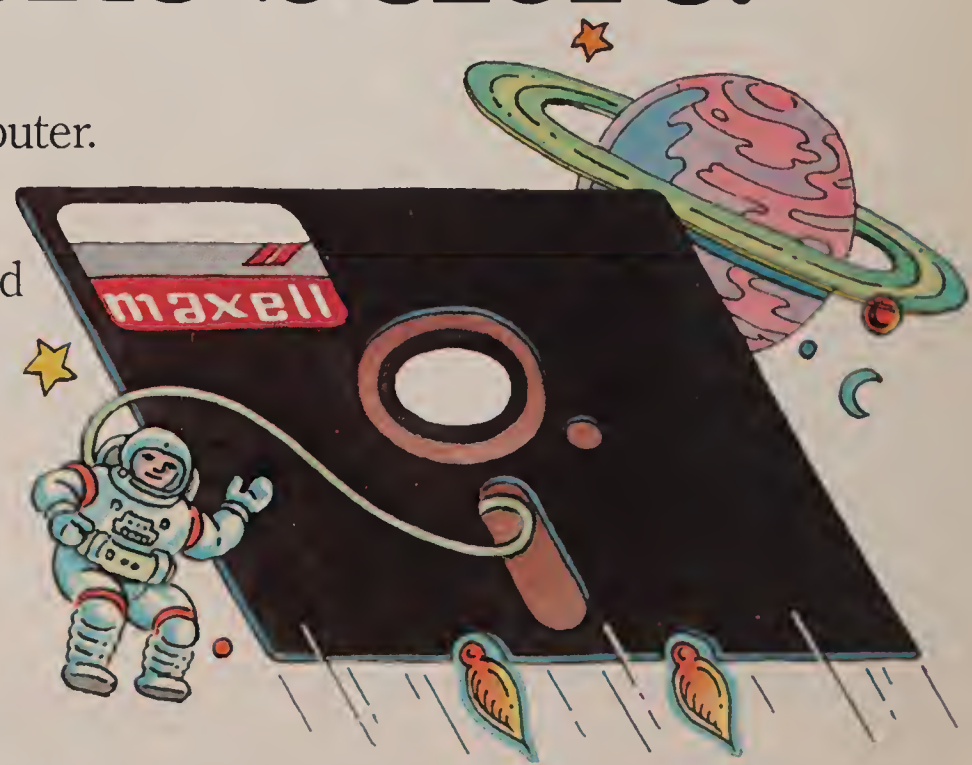
INFOCOM™

Cornerstone.
The sophisticated database system for the non-programmer.

Maxell Gold.

The floppy disk that packs more facts into Compaq®, sets HP® free, and takes IBM® Portable where it's never gone before.

It's great to have a portable computer. Especially when your data stays put. For error-free performance at home or abroad, trust Maxell. The Gold Standard in floppy disks. There's a Maxell disk for virtually every computer made. Each is backed by a lifetime warranty. Maxell. Accepted everywhere, without reservation.



maxell®
IT'S WORTH IT.

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074

Circle 578 on reader service card

Letters

Reactions and responses from the PC World community

Getting the Story

The chart included with "Word Processing '85" [*PCW*, January 1985] indicates that IBM's *DisplayWrite 2* can create ASCII files. If this is true, I'd love to know how it's done. A friend of mine who writes for television bought the program, hoping to use it with MCI Mail for transmitting scripts to his story editors.

I'm one of his story editors.

Steve Gerber
New York, New York

You can create an ASCII file with DisplayWrite 2 *by printing to disk, a trick you won't find in the documentation. As David Beckman noted in "DisplayWrite 2: In the Corporate Mold"* (PCW, *January 1985), the program reads ASCII files with its Get function.–Ed.*

The First Word Processor

Janette Martin's brief history of word processing ["New Dimensions in Word Processing," *PCW*, January 1985] cites 1964, when IBM introduced the MT/ST, as the watershed year for word processing. Although 1964 was a very good year–the year we [at IBM] announced the System/360–it was not the beginning of word processing.

In my opinion, word processing began the day in July of 1961 that I received approval from Fred Brooks, Jr. (manager of the System/360 project), to start work on my text editing proposal called Project Ross. With the help of many programmer friends, the first level was up and running on an IBM 7094 in 1962, but we could print only 64 characters at a time.

The System/360 I/O interface manual was printed with Project Ross and an IBM 1403 printer, a computer in itself. A version of Project Ross was released to IBM customers as a Type II 7094 program in 1964. A third version was released for the System/360 sometime later.

James W. Franklin
Hopewell Junction, New York

For those of us not conversant in mainframe, the System/360 was the first programmable processor. It was the brainchild of the "Wise Men of the East" who worked at IBM in Poughkeepsie, New York. The IBM 7094 was one of the PC's ancestors, with tubes and boards that had to be wired by hand.–Ed.

Perfect Knowledge

I congratulate you for commissioning an economist to write a *REMark* about the prognosis for the microcomputer market ["Predators, Inc.?" *PCW*, Vol. 2, No. 11].

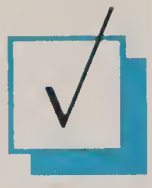
Andrew T. Williams' analysis rests on the premise that "the personal computer market . . . satisfies the major requirements of perfect competition." However, Williams did not mention that one of the major requirements of perfect competition is that everybody know everything worth knowing. Economists call this assumption perfect information.

While the assumption of perfect information is not unusual for economists, the thoughtful reader must ask whether such an analysis is reasonable in this instance. Perhaps the topic requires a fundamentally different analytical framework. Information has always been a commodity that must be produced like any other commodity, but in the last ten years the market for information has at-

For bright new ideas in personal computing...

...subscribe to PC WORLD today.

You'll save $23 and ensure access to the best new ideas in business and personal computing!



YES! Enter my subscription for 12 issues of *PC World* at just $11.97! I'll save $23 off the single copy price and $11 off the basic subscription rate.

☐ Bill me ☐ Payment enclosed

☐ New subscription ☐ Renewal

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272)

Name _____

Company _____

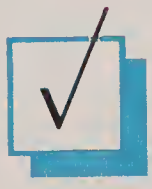
Address _____

City, State, Zip _____

Basic subscription rate: $23.75/year (12 issues). Single copy price: $35.40/year. Please allow 6 to 8 weeks for shipment of your first issue. Outside the U.S. orders must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25/year for surface mail or $100/year for airmail. Offer expires September 30, 1985.

PC WORLD

3 JHCA7



YES! Enter my subscription for 12 issues of *PC World* at just $11.97! I'll save $23 off the single copy price and $11 off the basic subscription rate.

☐ Bill me ☐ Payment enclosed

☐ New subscription ☐ Renewal

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272)

Name _____

Company _____

Address _____

City, State, Zip _____

Basic subscription rate: $23.75/year (12 issues). Single copy price: $35.40/year. Please allow 6 to 8 weeks for shipment of your first issue. Outside the U.S. orders must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25/year for surface mail or $100/year for airmail. Offer expires September 30, 1985.

PC WORLD

3 JHCA7

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621

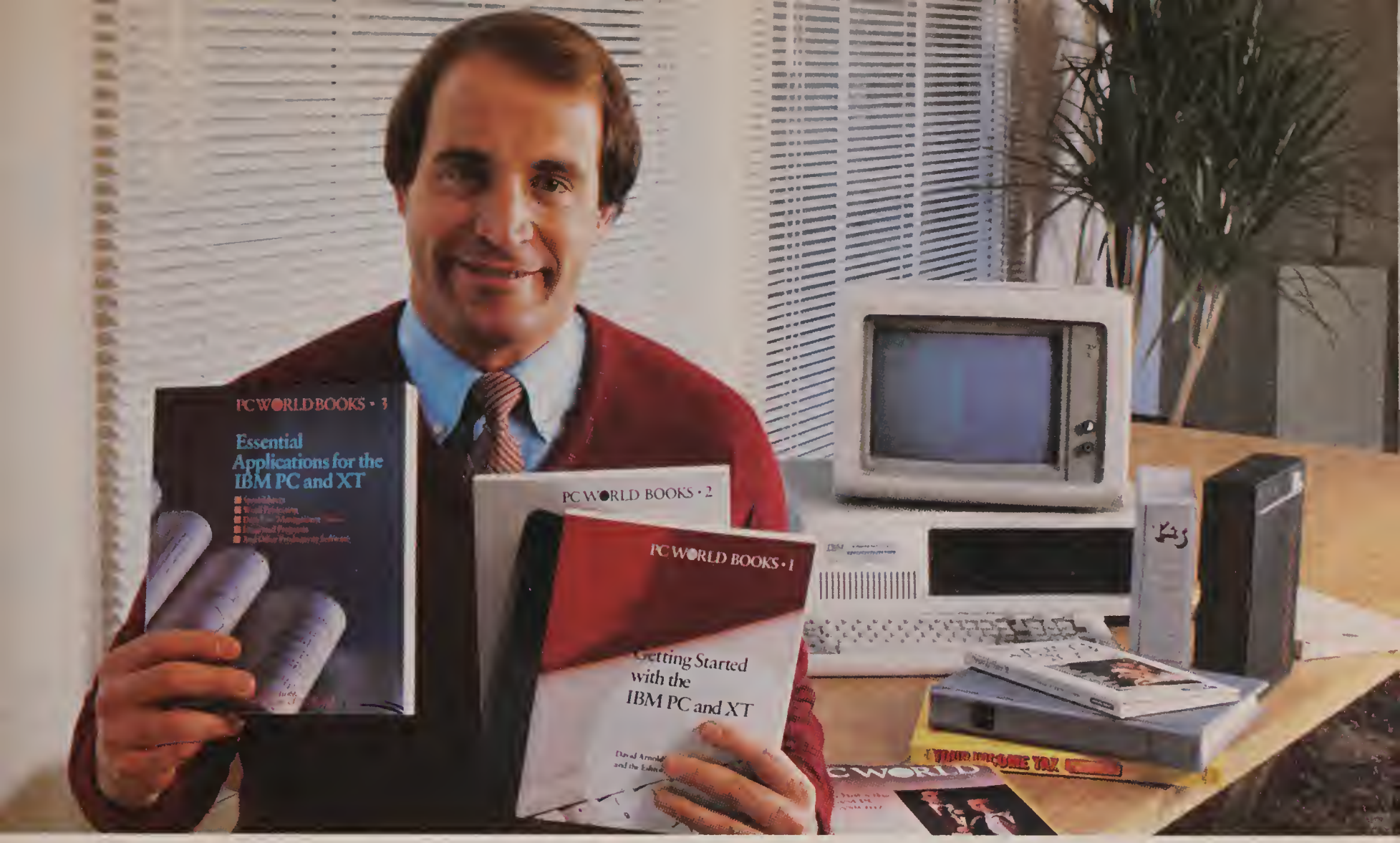
NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621



There Are Times When Having The Right Name Really Counts For Something.

Today's computer world is a jungle. With so much to choose from, you have to be wary. Computers in all sizes, priced for any budget. And enough accessories and software to make your head spin.

Then there are the books that are supposed to help you through all this. About 3,000 of them at last count. If you have time, you could check them all. But there is a better way. Look at the name. That's what smart buyers do. They go with a name that's been around. One with a reputation for excellence. One they can trust. A name like **PC WORLD BOOKS**, written by the editors of PC WORLD, a standout in the computer field.

All three books are reader friendly, each taking you step by step through every area of PC operation.

Book 1, GETTING STARTED WITH THE IBM® PC AND XT, is a total guide covering keyboard, disks, and operating systems (DOS 1.10 and 2.00). It shows you how to set up electronic files, work with BASIC, determine software needs, maintain your machine, plus a lot more.

Book 2, HOW TO BUY AN IBM PC OR COMPATIBLE COMPUTER, will help you through the computer jungle by making sense out of the many choices you have when buying a PC, saving you days trying to decide which PC configuration is for you. It will also help you choose disk drives, displays, printers, and software of every kind.

Book 3, ESSENTIAL APPLICATIONS FOR THE IBM PC AND XT, is an introduction to the full range of business applications for the PC: disks, spread sheets, word processing, data base management, integrated programs, and other productivity software.

IBM is a Registered Trademark of International Business Machines Corp.

All three **PC WORLD BOOKS** are on sale now at book and computer stores. The price is low for a safe journey through a jungle.

PC WORLD BOOKS

To order call TOLL FREE: 1-800-437-4400. Ext. 807. American Express, Visa, MasterCard only. Add $2.00 per order for postage and handling. Or use this coupon.

☐ **YES! Send the books I have checked. Enclosed is my check, money order, or credit card information.**

	# of copies		
Getting Started (49277-2)	____	@ $14.95 =	$____
How to Buy (49282-9)	____	@ $14.95 =	____
Essential Applications (49279-9)	____	@ $16.95 =	____
Add Sales Tax Where Applicable			____
Postage and Handling			2.00
Total			$____

Name ____

Address ____

City ____ State ____ Zip ____

Tel. # ____

Credit Card Orders: [ ]Visa [ ]MasterCard Exp. Date: ____

Card # ____

Signature

MAIL TO:
SIMON & SCHUSTER ELECTRONIC PUBLISHING GROUP
1230 Avenue of the Americas, New York, NY 10020

485

Circle 928 on reader service card

The Temptation to Peek

When learning to type, the temptation to peek at the keys is overwhelming. You can't learn to touch type if the computer beeps and displays every error you make, forcing you to play "keyboard peekaboo."

Typing Made Easy is different. You focus on what you are typing, not on your errors. It's the only computer-based typing course that teaches touch typing—typing without looking at the keys.

It runs on the IBM PC, PC AT, PC*jr*, all the compatibles, all the Apples and the Macintosh.

Free 15-Day Trial

Compare our course with any other. If it is not the best you've seen return it. Call 800-343-4848 (617-237-5656 in Mass.) for details about Typing Made Easy and our other tutorials.

We're QED, the computer industry's leader in classroom education, publishing, and training software.

QED Information Sciences, Inc.
QED Plaza, P.O. Box 181
Wellesley, MA 02181

**Also available from: DSI Micro, Eczel, J.L. Hammett, Moore Business Centers, Wayside Systems, Wright Line, & Technology Services, Inc.*

Circle 198 on reader service card

tained an importance second to none. And no important commodity market can reasonably be analyzed with logic that starts by assuming that said market is saturated.

Woodrow F. Dick, Jr.
Springfield, Virginia

As Mr. Dick notes, many economists (myself included) analyze markets by assuming perfect information, by which we mean that there are no barriers to entry. In other words, any company can find out everything it needs to know to enter the market with its own microcomputer hardware or software. A lack of such information would be considered a barrier to entry.

However, Mr. Dick confuses the information required for the market to function with the information manipulated and disseminated by microcomputers. It would be better to call the former sort of information "knowledge" (knowledge about production methods), and the latter simply "information" (which can be about anything).

In this sense, information is limitless in the same way that art or music may be said to be limitless; the microcomputer has had a major impact on the production and distribution of information of all kinds. But, clearly, information in this sense has little to do with the competitive functioning of the microcomputer market. Information, which is used by computers, is different from the knowledge required to enter the market and to promote competition.—Andrew T. Williams

A Videotex Revolution?

My compliments on your article "Toward a Graphics Standard" in the November issue, concerning the NAPLPS standard [*PCW*, Vol. 2, No. 12]. Although the article stimulates serious commercial speculation, I was disappointed that no reference was made to NAPLPS's impact on the home IVT (interactive video terminal) or on the age-old analog/digital controversy. Is it prehistoric to value the analog signal for computing and communications, considering its economical mass image storage and fast scan advantages? Does the creation of NAPLPS imply that all images will be re-created for storage in digital form, or will this system advance technology for analog to digital conversion? Is this standard intended only for graphics and videotex generated by internal programming, or will NAPLPS affect and guide the use of converted analog video images?

Norm Meyer
Mississauga, Ontario
Canada

The NAPLPS graphics standard has never been intended as a replacement for the video coding standards used throughout the world. The television standard used in North America, NTSC, is an analog standard and remains the most effective means of transmitting full-motion video signals. Unfortunately, while NTSC allows low-cost reception of high-quality images, it requires roughly 5 MHz,

Draw Your Own Destiny

If You Can Dream It, Do It With PC-Draw.

Go on. Think big. For the world beats a path to the door of those who *make things happen*. Now, graphically depict your bold new concepts. From ingenious ideas and designs — to master plans and proposals. Communicate with absolute clarity. And create truly *persuasive* presentations and reports.

What fuels the power of your mind? PC-Draw™. An incredibly versatile, *interactive* graphics program for the IBM PC™, XT™, AT™ or enhanced PCjr™ — *unlike anything else* on the market. Using your personal computer and a plotter or printer you conceive, develop, then produce a *hard copy* picture of your thoughts. An optional light pen makes PC-Draw even easier to use.

PC-Draw offers much more than mere painting systems. With it, create *in far greater detail* an endless variety of presentation graphics, proposals, systems design, charts, forms, diagrams and illustrations. Produce drawings *up to 99 pages* long. Use PC-Draw symbol libraries for applications such as flowcharting, organization charts, forms design, office layout and electrical design. And more. Or generate and store your *own* unlimited supply of user defined symbols.

Try PC-Draw for a 10 Day Trial Period.

PC-Draw includes an *easy to follow* interactive tutorial. Requires IBM compatible computer, graphics adapter and graphics monitor (or IBM monochrome monitor with **Paradise™ modular graphics card).** Graphic boards, light pens at excellent prices.

Go ahead. Control *your* destiny. Dial **800/2PC-DRAW** to order or for free brochure. In Texas or for customer support call 214/234-1769. MICROGRAFX, Inc., 1701 N. Greenville Ave., Suite 305, Richardson, Texas 75081.

MICROGRAFX™

The Picture of Success.

(Most popular plotters & printers supported. Version for PCjr available)

PC-Draw and MICROGRAFX are trademarks of MICROGRAFX, Inc.
IBM, PC, XT, AT and PCjr are trademarks of International Business Machines Corp. Paradise is a trademark of Paradise Systems, Inc.

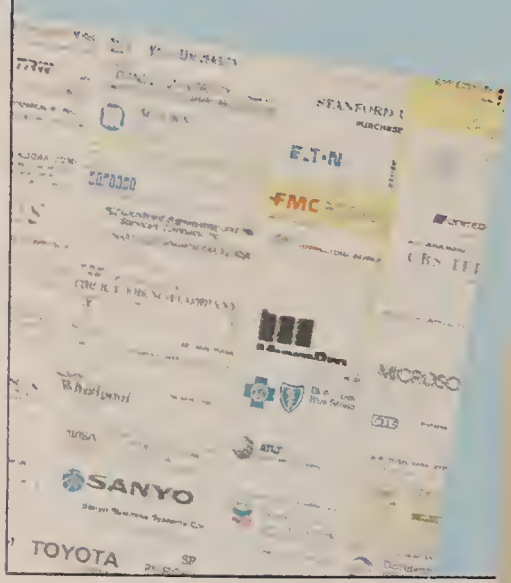
Circle 40 on reader service card

Discover what 50,000

QUBIE' delivers the finest peripheral available in terms of features, reliability and price/performance. That's why corporations like IBM, GM and Exxon buy peripheral equipment from Qubie', and have for years. Check some of your old back issues of PC — we've been satisfying PC owners since 1982.

Select products at low prices, with service and support unparalleled in the microcomputer industry. Our 30 day No Risk Guarantee and 48 Hour Repair Service during the 12 month warranty period is proof our products are first rate. We stand behind what we sell. No "call the manufacturer" responses when you have a question. We also offer our exclusive **Preferred Customer Plan**[*1] with 24 hour repairs and 24 months of coverage.

Our low, money-saving prices are the total prices. No small print telling you to add up for credit card charges or shipping and handling. Our prices include surface UPS charges and insurance. In a hurry? 2-day air UPS service is available.[*2]



At Qubie', customer satisfaction is one of the cornerstones of our philosophy. Ask your friends, business associates and colleagues about Qubie'. Chances are they are one of our fifty thousand satisfied customers.

STANDBY POWER SUPPLY

SB200 $329
XT300 $429

Noise Filtering/Surge Suppression • Powers Your Computer For Up To 30 Minutes In The Event Of A Blackout Or Brownout • SB200 (200 Watt) For Floppy-Based Systems, XT300 (300 Watt) For Hard Disk Based Systems

HIGH RESOLUTION MONOCHROME MONITORS

HR 39 $149
HR 134 $159

Plugs Into The IBM Monochrome or Compatible Adapter Card • 720 x 350 Resolution • 12" Diagonal Screen • Super Crisp Text Capability • High Resolution TTL • Includes Tilt/Swivel Base and Interface Cable • HR 134 (Amber) HR 39 (Green)

MULTIFUNCTION CARD

BT6Plus (0K) $195
BT6Plus (384K) $299

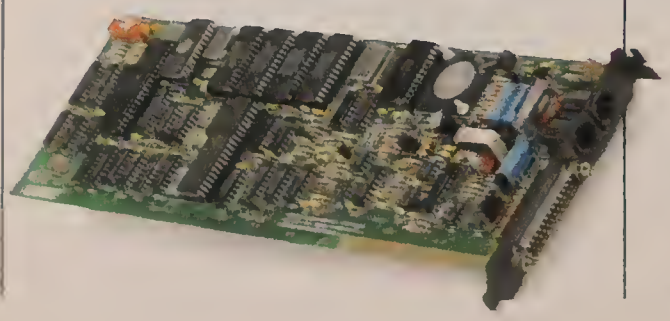
Memory Sockets For Adding Up To 384K • Parallel Printer Port • Asynchronous Serial Communications Port • Battery-powered Clock / Calendar • BTPak Software — BTDrive

(Electronic Disk Emulation) and BTSpool (Print Spooling Software) •

INTERNAL MODEM

PC212A/1200 $249

Auto-dial, Auto-Answer • 300/1200 Baud Operation • Runs Hayes Compatible Software Like Crosstalk, Smartcom II, and Sidekick • Two Phone Jacks Allow You To Hook Up Desk Phone • Includes PC-



TALK III Software (Complete Communications Package), Modular Phone Cord, User's Manual / Installation Instructions • Optional Serial Port ($30) Allows You To Use Port For Other Peripherals When Modem Is Not Being Used.

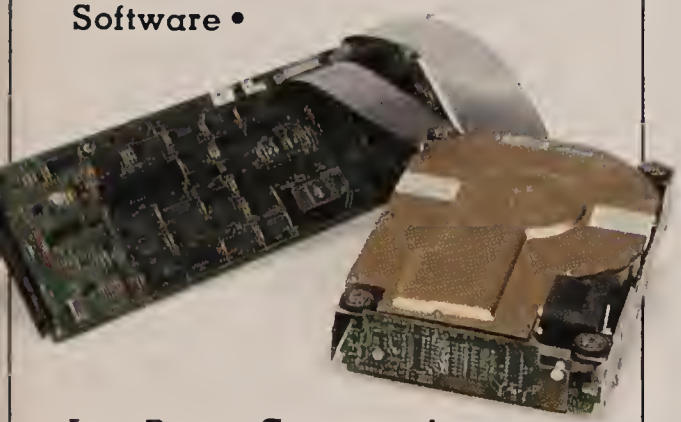
PC owners now know.

Optional Game Port — Chips, Dual Mounting Bracket and Cable ($20) • 64K Memory — Installed and Tested ($25) • Includes Cable, Single Slot Mounting Bracket, Installation Instructions / User's Manual

INTERNAL HARD DISK SUBSYSTEMS

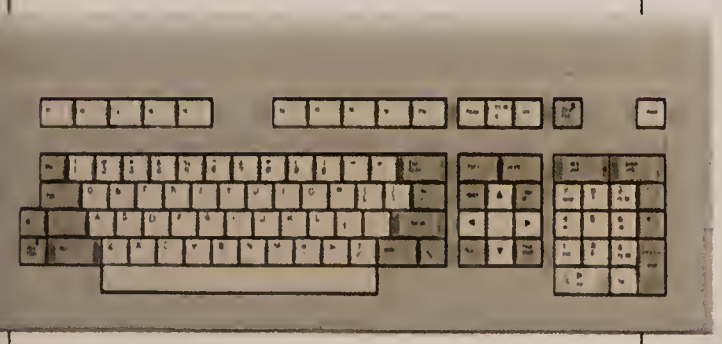
PC10 $699
PC20 $1088

Boot From The Hard Disk — No Software Patches or Drivers To Install • Runs All The Popular Software •



Low Power Consumption • High Reliability And Durability — Specially Plated Drives • Faster Access Time Than XT • Includes 1dir "Visual Shell" Software, Cables, Mounting Hardware, Installation Instructions/User's Manual, Full-Height Bezel — Optional Half-Height Bezel ($15) • Auxiliary Power Supply And External Models Are Also Available.

Adjustment • Keys In Standard Typewriter Positions • Separate Cursor Control and Numeric Keypads • Easy-To-Read Key Legends • LED Indicators On All Lock Keys • Extra-Wide Left-Hand Control Key Adjacent To "A" • Control/Reset Replaces Awkward Contol/Alt/Delete • Plugs Into IBM PC, PC/XT and Compaq Deskpro



KEYBOARD

ff5151 $159

Solid State Capacitive Key Switches • 3-Position Height

EXTERNAL MODEM

212A/1200E $299

Auto-dial, Auto-Answer • 300/1200 Baud Operation • Runs Hayes Compatible Software Like Crosstalk, Smartcom II, And Sidekick • Two Phone Jacks Allow You To Hook Up Desk Phone • RS-232C Compatible • Includes 8' Shielded Cable (Specify Male Or Female) • Eight Status Indicator Lamps • External Volume Control Knob

HIGH RESOLUTION COLOR MONITOR

HR31 200 $439

14" Diagonal Screen • Black Matrix Picture Tube Reduces Glare And Enhances RGB Color • Plugs Into IBM Color/Graphics Or Compatible Adapter Card • 640 x 200 Resolution • Includes Interface Cable And Tilt/Swivel Base

	*1 PREFERRED CUSTOMER PLAN	*2 UPS BLUE LABEL
PC10 and PC20	$150.00	$12.00
Modems	50.00	5.00
ff5151	35.00	7.50
BT6Plus	50.00	5.00
HR 39 and HR 134	50.00	NA
HR31 200	95.00	NA

No Risk Guarantee
If you are not completely satisfied with your purchase, you may return it within 30 days for a full refund, including the cost to send it back.

The Acid Test
If you can get any dealer or competitor to give you the same No Risk Guarantee, buy both products and return the one you don't like.

For fastest delivery, send cashier's check, money order, or order by Mastercard/Visa. Personal checks, allow 18 days to clear. Company purchase orders accepted, call for prior authorization. California residents, add 6% sales tax.

Hours: M-F 8 am-6 pm PTZ
Sat 9 am-1 pm PTZ
London (01) 223-4569
Paris (01) 321-5316
Sydney (02) 579-3322

VISA
master charge

Outside California
1-800-821-4479
Inside California
1-805-987-9741

4809 Calle Alto
Camarillo, California 93010

QUBIE'

Order Today, Shipped Tomorrow!™

Circle 907 on reader service card

NOW THERE'S AN EASIER WAY TO CONTROL YOUR PRINTER.

ADAPTA-PRINT® SOFTWARE

FAST AND EASY FINGERTIP CONTROL OF YOUR PRINTER

- Adapta-Print's pop-up menu lets you use your printer to its fullest capability—without having to exit whatever program you're working on. That includes full control of form layout, type style, and general printer functions.
- **For non-IBM compatible printers,** a built-in translator makes your printer compatible with the IBM, allowing it to generate pictures using Lotus 1-2-3* and most other software.
- There's an option available called TURN that gives Adapta-Print the capability to print sideways.
- A built-in spooler allows your printer to print one job while you work on another.
- Available for many brands of dot matrix printers, including **Epson, Okidata, Hewlett-Packard, NEC, Toshiba, Mannesmann Tally, C. Itoh, Datasouth,** and most other dot matrix printers.

PURCHASE ADAPTA-PRINT® FOR ONLY $65.

(Plus $2 for handling & shipping)

(TURN option is $24 additional)

Call 615-966-1399 with your Visa or MasterCard number. Operators are on duty weekdays until 9:00 EST. Or send your check or money order to the address below.

Computational Systems Incorporated

Department PCW • One Energy Center, Pellissippi Parkway, • Knoxville, Tennessee 37922

*Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

Circle 82 on reader service card

or over 1000 voice channels' worth, of bandwidth. Such a requirement makes interactive (two-way) video communication prohibitively expensive. NAPLPS overcomes this drawback of analog coding, allowing images to be transmitted in a reasonable amount of time over ordinary telephone lines and to be stored by low-cost digital devices (personal computers or dedicated videotex terminals).

However, all these advantages come at the price of simpler images. While NAPLPS could, in theory, be used to digitally encode a continuous-tone color image (as opposed to the "cartoon-like" images for which it was designed), such an approach would not be very effective. In short, while graphics standards like NAPLPS hold considerable promise, they by no means make analog video standards like NTSC obsolete or "prehistoric."—Mark Dietrich and Jennifer Stothers

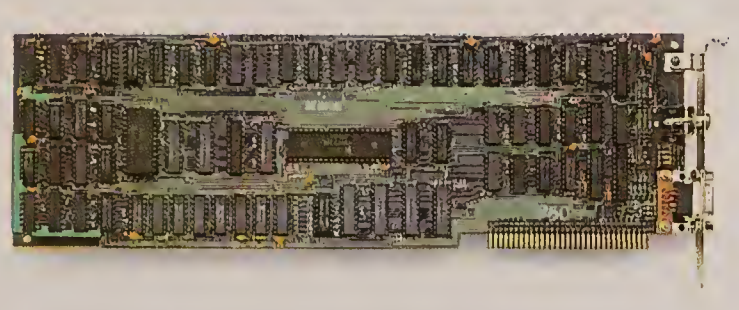
The AT's Network

I enjoyed the December article on the AT ["AT: The PC's Powerful Partner," *PCW*, Vol. 2, No. 13], but I was disappointed to find a few errors relating to PC Network. As you are aware, Sytek supplies the network adapter card to IBM, and we also developed the protocols that IBM licensed for use in the network.

Specifically, the Base Expander is not a repeater that boosts the signal but rather is a passive attachment that provides eight addi-

Compare the Hercules™ Color Card to IBM®'s.

Five reasons why the Hercules Color Card is better.



	IBM Color Adapter $244	Hercules Color Card $245
1. Compatibility	Runs hundreds of graphics programs.	Runs the same hundreds of graphics programs. "The Hercules Color Card is so nearly identical to the IBM Color/Graphics Card that it's almost uncanny." PC Mag.
2. Printer port.	None.	Standard. Our parallel port allows you to hook up to any IBM compatible printer.
3. Size.	13.25 inches. Limited to long slots.	5.25 inches. Fits in a long or short slot in a PC, XT, AT or *Portable*.
4. Flexibility.	Can't always work with a Hercules Graphics Card.	Always works with a Hercules Graphics Card by means of a software switch.
5. Warranty.	90 days.	Two years.

Any one of these five features is enough reason to buy a Hercules Color Card. But perhaps the most convincing reason of all is just how easy the Hercules Color Card is to use: "Right out of the box, the Hercules Color Card goes into an empty expansion slot, ready for you to plug in. . . and go to work—no jumpers, no software. For most applications, it's just that easy." PC Magazine.

Call **1-800-532-0600 Ext. 432** for the name of the Hercules dealer nearest you and we'll rush you our free info kit.

Hercules.
We're strong on graphics.

Address: Hercules, 2550 Ninth St, Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063 **Trademarks/Owners:** Hercules/Hercules Computer Technology; IBM/IBM.

Circle 77 on reader service card

INTRODUCING THE PRINTER THAT MAKES THE BEST IMPRESSION ON ANY SYSTEM.

Most printers have been designed to work best with just one computing system.

So if you bought different systems for different reasons, you also ended up buying different printers. And matching each printer to its system.

Now there's the LA210™ Letterprinter, compact and flexible enough to do the job of 2 printers. Or 3. Or 4. Because the LA210 gives you a serial interface to match Digital's own complete line of systems, and an available parallel interface for the IBM personal computer and compatibles. You can even order plug-in cartridges that emulate three of the most popular IBM compatible printers.

Which means, quite simply, you can expand your computing capabilities any way you see fit. For word processing, data processing, bit map or mosaic graphics. For VAX,™ PDP-11,™ or any other Digital system, as well as the IBM environment, too.

And you don't need to worry about spending a lot of money for a new printer for each system.

THE LA210 DELIVERS WHAT YOU NEED WHERE YOU NEED IT.

The LA210's system independence is rivalled only by its general versatility.

For applications with reams of output, like business accounting or complex scientific programming, the LA210's 9x7 dot matrix printhead will print up to 240 characters per second, or a full double-spaced page every 10 seconds.

But when your needs change, so can the LA210.

Flick a switch and the LA210 shifts to an 18x33 matrix for crisp, near-letter quality copy at up to 40 characters per second.

Or let your host computer change modes for you automatically under program control.

There's more, too. With its standard Courier type face, the LA210 can print 11 languages,

© Digital Equipment Corporation, 1985. Digital, the Digital logo, LA210, VAX, PDP-11, VT100, LA120, LA36 and VAXcluster are trademarks of Digital Equipment Corporation.
IBM is a registered trademark of International Business Machines Corporation. Epson MX80 and Graftrax are trademarks of Epson America, Inc.

plus Digital's VT100™ line drawing set. And it gives you a choice of more than 35 optional faces and fonts – Courier, Orator, Gothic, APL, and italics as well as special custom fonts – through plug-in cartridges that let you vary your type face even more. Finally, the LA210 lets you print bold or condensed and change faces or fonts on a dynamic character-by-character basis. So your output is truly customized to suit just about any presentation you have in mind.

Plug-in cartridges also allow the LA210 to emulate three of the most popular IBM compatible printers – the IBM Graphics Printer, the Epson MX80™ with mosaic graphics, and the MX80 with Graftrax™ bit map graphics. So you can produce charts and graphs with all the resolution and professional look of bit map graphics. Yet still retain complete compatability with software that generates mosaics.

All without a hitch. All without compromising a bit of the power of the software you're using.

STANDARD EQUIPMENT THAT OTHERS CALL OPTIONS. AND OPTIONS OTHERS CAN'T MATCH.

It wouldn't make sense for a printer this versatile to lack any of the features you really need.

So standard equipment includes a 2k buffer and adjustable forms tractor with acoustic cover.

Making the LA210 one of the quietest printers in its class as well as one of the fastest.

Add the optional bi-directional tractor, and you can easily handle superscripting and subscripting and full page reverse for multiple column printing.

There's even a cut sheet feeder to speed up correspondence on your letterhead.

The LA210 also comes with one more feature no other printer can offer. Digital's exceptional reputation. We've set industry standards with products like VAX and PDP-11 systems. We've done the same in terminals and printers with our VT100, LA36, LA120, and others. In fact, with more than 750,000 printers installed worldwide, we're a recognized leader with a proven record of reliability. And we back every printer we sell with one of the most comprehensive service plans in the business.

ONE SOLUTION FOR AN OFFICE FULL OF NEEDS.

No matter what your office needs may be, Digital has you covered with the new LA210.

You can work with systems within Digital's broad line of personal computers, within any of our larger systems – all the way up to the largest VAXcluster™ systems – or within the IBM PC environment.

You can handle mountains of throughput at draft speed, or print professional looking letters with near-letter quality. You can print bit map or mosaic graphics.

You can even customize documents – word by word or letter by letter if need be – with a broad range of type faces and special effects.

All with a single printer.

So whether you already have a number of different systems in place and want the economies of a single printer that can handle them all, or you just want the added flexibility for future expansion, no single printer handles all your problems like the LA210 from Digital.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The LA210, like every Digital hardware and software product, is engineered to conform to an overall computing strategy. This means our products are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy from desktop to data center.

For a detailed brochure or more information, as well as the name of the Authorized Terminals Distributor or Digital Representative near you, call 1-800-DIGITAL, extension 700. Or write Digital Equipment Corporation, 129 Parker Street, Maynard, MA 01754.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

digital™

Circle 957 on reader service card

tional ports. More important, PC Network's channel speed is 2 megabits per second, as you reported correctly on one page and incorrectly on another. Both IBM and Sytek have verified the application-to-application throughput at 600 kilobits per second.

William R. Pieser
Sytek
Mountain View, California

Requirements

I find it confusing when software reviews give only partial hardware requirements. For example, I often read that two disk drives are required. Are they single- or double-sided drives?

J. J. Witt
Rye, New York

They are double-sided drives. As the PC has been equipped with double-sided drives since May of 1982, we assume that most of our readers have them. If you still have single-sided drives, you are probably aware of potential problems; ask first before making any software purchases.—Ed.

Letters should be mailed to Letters, PC World, *555 De Haro St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD, CompuServe 74055,412, or The Source STE908. We reserve the right to edit letters. Letters should not exceed 300 words.*

IBM COPY PROTECTION

A versatile system that works.

Call ALF first
1-800-321-4668

MultiGuard is ALF's new IBM copy protection system. It's reasonably priced, yet offers maximum protection and flexibility. Call the toll-free number above for our pamphlet on copy protection systems. Inside Colorado, call 234-0871.

ALF ALF Products • Denver, CO

BLANK DISKS

Major Brands • Low Prices

Call ALF first
1-800-321-4668

If you need 50 or more top quality disks, bulk-packed (without expensive labels or fancy packaging), call the toll-free number above for the latest price on your favorite brand. ALF copies thousands of disks each day—so we know which disks will perform best with your system! Inside Colorado call 234-0871.

ALF ALF Products • Denver, CO

If you've ever scribbled on a yellow pad, a napkin, a tablecloth, a notebook or a memo pad,

If you've ever used even the simplest tools of business to prepare a budget, predict a trend, plan a schedule or to analyze information of any kind,

If you deal in straight lines, curved lines, credit lines or bottom lines,

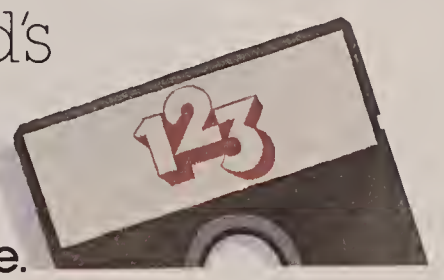
If you've ever asked "what if," "why not," or "how come?"

If you've ever taken into account a variable, a sudden change of plans, a mid-course correction or the weather,

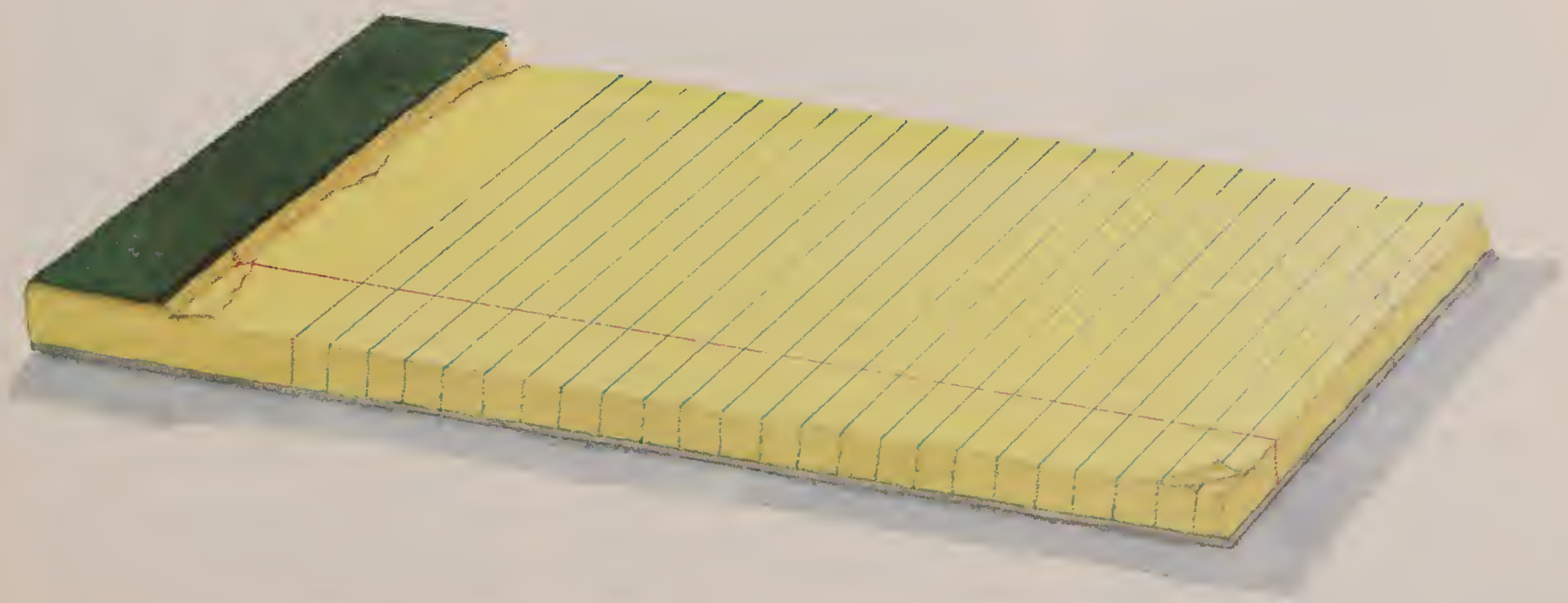
If you work in any kind of business, anywhere in the world, then you can use 1-2-3® software from Lotus.®

That's what makes the world's most powerful analytical tool the world's most popular.

More people use it because it does so much more.



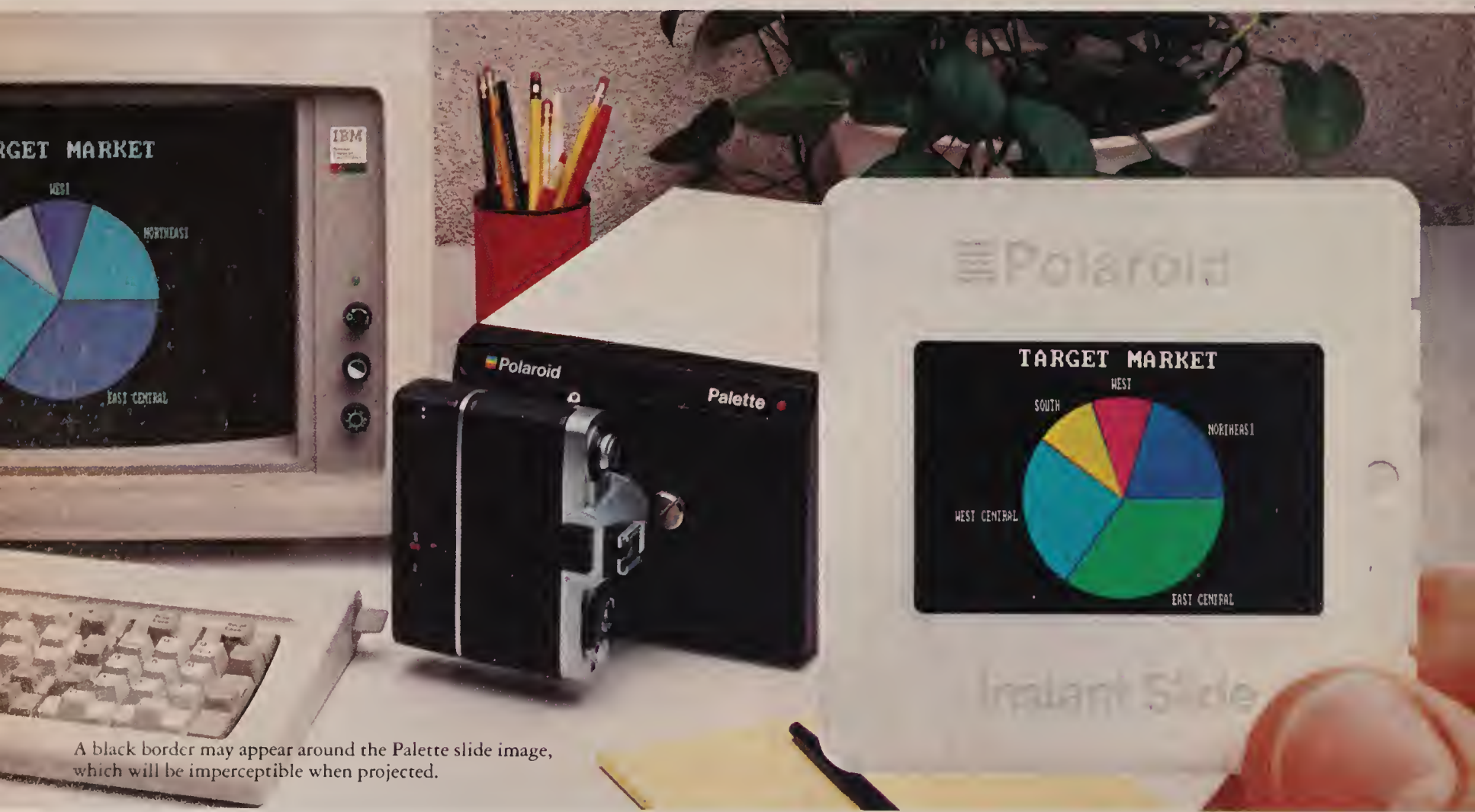
Lotus®



1-2-3 unites spreadsheet, database and graphics in one fully integrated software package.

Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation
©1985 Lotus Development Corporation

Now last minute presentations can be made from your personal computer. In color. In house. In minutes.



A black border may appear around the Palette slide image, which will be imperceptible when projected.

Introducing Polaroid Palette.

Whether your presentation is in 30 minutes or 30 days, the new Polaroid Palette Computer Image Recorder will make it easier. Priced at under $1800*, it lets you make Polaroid 35mm Instant Slides or prints from personal computer-generated data. Right at your desk. So now you can create a presentation in minutes. Without sending out for processing, paying premiums for rush service or risking the security of your confidential information.

Works with the graphics packages of the IBM PC or XT, DEC Rainbow or PRO, Apple IIe or II+ and AT&T 6300.

The Polaroid Palette is designed to work with many graphics software packages. In fact, when using such programs as Graphwriter, Chart-Master, Sign-Master, DR Draw, DR Graph, and ATHENA/graph, Palette can virtually double both the horizontal and vertical resolution of your monitor. Plus, a "backfill" feature reduces raster lines for a smoother, more finished appearance. The result—presentation quality slides. On-the-spot.

Color 35mm slides, even from a black and white CRT.

Think of it as an artist's palette. Because Palette "paints" your graphs, charts and text. You're choosing from up to 72 colors. If you don't want red, press a few keys—it's green. And if you're not the artistic-type, Polaroid has developed a menu of color sets: combinations of colors that have been specially coordinated to complement your presentations. And all of this is yours, even if you have a black and white monitor.

Lets you make last minute changes or add up-to-the-minute information.

The Polaroid Palette is the fast, convenient, low-cost way to prepare slides for your presentation. And perhaps even more important, Palette allows you to keep confidential information confidential. You won't have to send your work out to anyone again.

So why wait until the last minute to find out about Polaroid Palette? Contact one of the Palette dealers listed here or call the toll-free number on the opposite page. Look at it this way, now you can change your presentation as fast as you change your mind.

*Suggested list price. Polaroid®

Alabama: Business Graphics, Birmingham, (205) 663-2492; The Computer Shoppe #210, Huntsville, (205) 830-2615.

Arizona: Computer Superstores, Phoenix, (602) 957-6780; American Computer Svs., Phoenix, (602) 978-3244, MicroAge Computer Store, Phoenix, (602) 265-0065, Computerland Major Accounts, Phoenix, (602) 861-9667, MicroAge Computer Store, Tucson, (602) 571-1201 or 887-1485.

Arkansas: The Computer Shoppe #215, Little Rock, (501) 375-5544

California: Drake Morton (Lomita Pacific Photo), Lomita, (213) 326-7077; Raytec, Inc., San Diego, (619) 695-8611.

Los Angeles: Media Fabricators, Los Angeles, (213) 937-3344 or (714) 954-0590; Computer Business Center, Santa Monica, (213) 452-2027; Long Beach Micro, Long Beach, (213) 435-3006; Advanced Computer Products, Santa Ana, (714) 558-8813; Photo & Sound, El Monte, (213) 575-1924; Software Central, Pasadena, (818) 793-4101; Computerland of Simi Valley, Simi Valley, (805) 583-5585; Manumit Microcomputers, Anaheim, (714) 520-0411; #33 Businessland, Los Angeles, (213) 387-1938.

San Francisco Area: Image Sales, Inc., Walnut Creek, (415) 932-1031 or (800) 321-1821; KSP Inc., Palo Alto, (415) 327-8996; Computerland/Dublin, Dublin, (415) 828-8090; Able Computer, Belmont, (415) 593-2253; Imago Data, Sunnyvale, (408) 737-9172; PC Support, Sunnyvale, (408) 746-2772; Photo & Sound, San Francisco, (415) 421-0410; #6 Businessland, San Francisco, (415) 989-3741.

Colorado: Fairview Audio-Visual, Englewood, (303) 771-6335; BFA Corp., Denver, (303) 777-8070.

Connecticut: Computerease, Avon, (203) 677-7191; Computerease, Danbury, (203) 794-9493; Computerease, Darien, (203) 656-1494, Computerease, E. Hartford, (203) 278-1080; Computerease, Milford, (203) 877-7447; Entre Computer Center, Stamford, (203) 967-2233.

Delaware: RSG Computer Supplies, Inc., Newark, (302) 368-4938.

Florida: Micro Mart, Altamonte Springs, (305) 830-4076; Micro Mart, Coral Gables, (305) 445-9500; Micro Mart, Ft. Lauderdale, (305) 749-0330; Computer Station, Jacksonville, (904) 724-3174; Micro Mart, Jacksonville, (904) 396-8089; Kendall Computers, Miami, (305) 274-6312; United Computers Business Center, Miami, (305) 371-6100; United Computers Business Center, Miami-Bay Harbor, (305) 868-8300; Procomp Systems, Inc., Pompano Beach, (305) 997-6313; Micro Mart, Tampa, (813) 972-5000.

Georgia: The Computer Pro, Augusta, (404) 737-8313; MicroWorks, Smyrna, Atlanta, (404) 980-1000; OTP, Atlanta, (404) 688-3107; Software Atlanta, Atlanta, (404) 934-0924; Boardroom Graphics Systems, Atlanta, (404) 457-2836; Southern Business Communications, Inc., Macon, (800) 282-5687; MicroWorks, Norcross, (404) 446-1678; Southern Business Communications, Inc., Norcross, (404) 449-4088; Micro Mart, Norcross, (404) 449-8081; Software Atlanta, Smyrna, (404) 434-4171; Computer Network, Smyrna, (404) 951-0134; Micro Mart, Smyrna (404) 956-8088; Southern Business Communications, Inc., Savannah, (800) 282-5687.

Illinois: Midwest Visual Equipment, Chicago, (312) 478-1250; Eberhardt Instruments, Downers Grove, (312) 964-4240, Computerland, Elmhurst, (312) 832-0075; NorthBrook Computer, NorthBrook, (312) 480-9190, Software and Beyond, Schaumburg, (312) 882-3733; New Orient Media, W. Dundee, (312) 428-6000.

Indiana: CBM Computer Center, Evansville, (812) 474-0555.

Kentucky: CBM Computer Center, Lexington, (606) 276-1519, The Computer Shoppe #209, Louisville, (502) 426-8787; The Computer Shoppe #217, Louisville, (502) 581-9109; CBM Computer Center, Louisville, (502) 425-7602; Micro Mart, Louisville, (502) 895-5624.

Louisiana: Micro Mart, Metairie, (504) 835-6481

Maryland: MBI Business Centers, Bethesda, (301) 657-1611; Folkemer Photo & Computer Center, Ellicott City, (301) 465-7788, Software Centre Wintergreen Plaza, Rockville, (301) 424-3024; MBI Business Centers, Rockville, (301) 984-8922; Micro Mart, Rockville, (301) 294-9000.

Massachusetts: Microsource Financial, Boston, (617) 423-0108, The Computer Store, Boston, (617) 426-4385, #52 Businessland, Boston, (617) 542-8099, Micro Store, Brockton, (617) 588-1837, The Computer Store, Burlington, (617) 272-8770; The Computer Store, Cambridge, (617) 354-4599; Entre Computer Center, Centerville, (617) 771-9747; Entre Computer Center, No. Dartmouth, (617) 997-3113, The Computer Store, Framingham, (617) 879-3720; Computerland Leominster, Leominster, (617) 534-5240; Computer Source, Pittsfield, (413) 443-7181; The Computer Store, Providence, (401) 331-0220; Micro Store, Taunton, (617) 823-8106; Microsource Financial, Watertown, (617) 924-5500;Computer Haus, Wilmington, (617) 657-6433.

Michigan: Inacomp Computer Center, Ann Arbor, (313) 665-4453; Inacomp Computer Center, E. Detroit, (313) 445-8010; Inacomp Computer Center, E. Lansing, (517) 351-1777; Inacomp Computer Center, Flint, (313) 234-0161; Inacomp Computer Center, Grand Rapids, (616) 942-2690; Inacomp Computer Center, Holland, (616) 396-5006; Inacomp Computer Center, Kalamazoo, (616) 323-2222; Lysinger Corp., Troy, (313) 583-1070; Inacomp Computer Center, Troy, (313) 649-0910.

Minnesota: Blumberg Communications, Minneapolis, (612) 333-1271.

Missouri: Photo & Sound, St. Louis, (314) 432-7190.

New Hampshire: McAuliffe, Inc., Keene, (603) 352-0258; Computer Barn, Salem, (603) 893-2511.

New Mexico: BFA Corp, Albuquerque, (505) 292-1212; Computer Superstores, Albuquerque, (505) 293-5370; BFA Corp, Las Cruces, (505) 524-9693.

Now Polaroid Palette's greatest partner, GraFIX Partner, is free.

These dealers are offering this $149 value* free with your Palette purchase until July 15th. It's GraFIX Partner, the graphics editor that lets you paint, draw, add text in 20 different fonts, and more...all while your other software is being run. Then with a single keystroke you capture the image on the Palette. So present this great team to yourself. Today.

New Jersey: Performance Software, Bloomfield, (201) 429-9099, MBI Business Centers, Cherry Hill, (609) 428-7055; Prodigy Systems, Edison, (201) 321-1717; Prodigy Systems, East Hanover, (201) 428-0200; Prodigy Systems, Green Brook, (201) 752-6300; TMA Logon, Hackensack, (201) 646-9222; Prodigy Systems, Iselin, (201) 283-0600, Prodigy Systems, Lawrenceville, (609) 452-1858; Clancy Paul Computer, New Brunswick, (201) 246-8585; MicroAge Computer Stores, Paramus, (201) 843-5678; Clancy Paul Computer, Princeton, (609) 683-0060; Clancy Paul Computer, Red Bank, (201) 747-7150; Software House of New Jersey, River Vale, (201) 664-5100.

New York State: The Computer Room, Albany, (518) 869-3818; Computer Professionals, Albany, (518) 438-0010; National Graphics, Albany, (518) 438-8411; Graphic Arts Computer Products, Buffalo, (716) 854-0004; The Computer Room, Glens Falls, (518) 798-1446; The Computer Room, Kingston, (914) 336-4155; Graphic Arts Computer Products, Rochester, (716) 342-0602; All Things Computer, Scarsdale, (914) 723-6262; The Computer Room, Schenectady, (518) 382-1182.

New York City: Future Information Systems, New York, (212) 732-3905 or 751-7888, Brilliant Image, New York, (212) 736-9661, Erin Data Systems, Melville, (516) 293-4114, MicroAge Computer Stores, Farmingdale, (516) 752-1600.

North Carolina: Carolina Camera Center, Inc Greensboro, (919) 379-9177; Audio Buys, Raleigh, (919) 821-1776.

Ohio: Radgo Computer, Cincinnati, (513) 752-6920; CBM Computer Center, Cincinnati, (513) 793-1787, Micro Mart, Cincinnati, (513) 621-8898, Programs Unltd., Columbus, (614) 228-4610; OTEC Computer, Mantua, (216) 274-2818, Northeast Business Center, Richmond Heights, (216) 442-4808; Programs Unltd., Worthington, (614) 431-2228.

Oklahoma: Argus Systems, Inc., Norman, (405) 329-0180; Fairview Audio Visual, Oklahoma City, (405) 521-0031; Fairview Audio Visual, Tulsa, (918) 664-8020.

Oregon: Photo & Sound, Portland, (503) 224-3456.

Pennsylvania: MBI Business Centers, Bala-Cynwyd, (215) 668-0870; MBI Business Centers, Jenkintown, (215) 576-6650; Computers for the Professional, Kulpsville, (215) 362-1888; S&S Klinetics, Media, (215) 565-5388; OTP, Philadelphia, (215) 925-6300; Monterey Microsystems, Inc., Pittsburgh, (412) 242-1188; MicroAge Computer Stores, Pittsburgh, (412) 323-2700; Micro Mart, Pittsburgh, (412) 391-3456; MBI Business Centers, Wayne, (215) 687-5991.

South Carolina: Southern Business Communications, Greenville, Spartanburg, (800) 241-5312.

Tennessee: The Computer Shoppe #219, Chattanooga, (615) 267-8107; Southern Business Communications, Inc., Chattanooga, (800) 241-5312; The Computer Shoppe #213, Goodlettsville, (615) 859-4015; The Computer Shoppe #216, Knoxville, (615) 690-8636; The Computer Shoppe #211, Nashville, (615) 366-3810; The Computer Shoppe #214, Nashville, (615) 255-3486; The Computer Shoppe #220, Nashville, (615) 292-4496; CBM Computer Center, Nashville, (615) 385-1855; Micro Mart, Nashville, (615) 292-5600; The Computer Shoppe #218, Memphis, (901) 682-7082.

Texas: The SoftSource, Dallas, (214) 361-4048 or 960-0413; Kimball Audio Video, Inc., Dallas, (214) 869-0117; #17 Businessland, Dallas, (214) 698-0374; Computer Superstores, El Paso, (915) 533-2215; Personal Computing Delta, Inc., Houston, (713) 850-8445; Jobar's Camera Center, Bellaire (Houston), (713) 668-5773.

Vermont: McAuliffe, Inc., Burlington, (802) 658-4444; McAuliffe, Inc., Rutland, (802) 775-1955, Entre Computer Center, Shelburne, (802) 985-3366.

Virginia: Technology Services, Alexandria, (703) 354-8668; Micro Graphics, Annandale, (703) 642-1444; MBI Business Centers, Arlington, (703) 892-1666; Cary's Camera Shop, Charlottesville, (804) 293-4552; MBI Business Centers, Fairfax, (703) 691-8600; Computerland of Hampton, Hampton, (804) 827-8899; Computerland of Norfolk, Norfolk, (804) 625-3427; Micro Age, Norfolk, (804) 461-6460; Computerland, Richmond, (804) 643-0225 or 741-3502; #41 Businessland, Rosslyn, (703) 524-5112; MBI Business Centers, Springfield, (703) 451-7100, MBI Business Centers, Sterling, (703) 430-0300 or (301) 450-4303; MBI Business Centers, Vienna, (703) 893-0300 or (703) 893-0683; Computerland of Virginia Beach, Virginia Beach, (804) 422-8271; Micro Graphics, Virginia Beach, (804) 460-9080.

Washington, D.C.: Memory Systems, Inc., (202) 429-1922; After Computer, (202) 822-0604; MBI Business Centers, (202) 463-7474 or 293-1390; OTP, (202) 371-2150.

Washington State: Savant Computer Support, Inc., Issaquah, (206) 643-9116; Photo & Sound, Kent, (206) 632-8461.

Wisconsin: Graphic Business Systems, Lake Geneva, (414) 248-9690; Allied Computer Group, Milwaukee, (414) 228-9333.

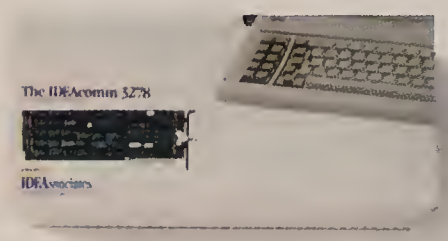
CALL 800-225-1618

Polaroid

The GraFIX Partner is a trademark of Brightbill-Roberts and Company, LTD *Suggested list price

Circle 241 on reader service card

IDEA is shipping new ideas for IBM's System 36.



Whether you have an IBM minicomputer or mainframe, IDEA offers a complete line of cost effective solutions for linking your IBM PC, XT, AT or Portable to your host.

Introducing the new IDEAcomm 5251.

The IDEAcomm 5251 communications card supports a twin-axial cable connection allowing your IBM PC, whatever the model, to communicate with IBM System 34, 36 and 38 minicomputers. Communications may be local or to an IBM 5251 Model 12 display controller.

Complete 5250 terminal emulation is supported for monochrome and color displays, including IBM 5251 Model 11, IBM 5291 Model 1 and 2, and IBM 5292 Model 1 terminals. Since IDEAcomm 5251 does not use DMA channel resources, there is no interference with hard disks or network cards.

And our new IDEAcomm 5251 D card supports the full 32 attributes of the IBM 5251 screen, or the card acts as a conventional monochrome display adapter.

Our new IDEA Minicomm is amazingly versatile.

If you need a truly versatile communications card for your IBM PC, you need the IDEA Minicomm. Supporting both Bisync and SNA/SDLC protocols, the Minicomm transmits data at 19.2 kilobits per second. The card allows remote communications over synchronous modems, and may be used locally with a modem eliminator.

And now IDEA offers four new software packages for the Minicomm:

- IDEAcomm 3270/BSC
- IDEAcomm 3270/SNA
- IDEAcomm 3770/SNA
- IDEAcomm 3780/BSC

These packages turn your IBM PC into a terminal or remote job entry station transferring program, data, or text files to the mainframe.

IDEAcomm 3278 is fast and flexible.

The IDEAcomm 3278 offers powerful file transfer that moves data up to 60% faster than IRMA. In benchmark studies, IDEAcomm 3278 transmission speed on a local mode 3274 was up to 60% faster than IRMA. And it takes just one key stroke to upload or download files. TSO and VM/CMS file transfer is standard.

Designed for maximum performance, IDEAcomm software lets you change colors and reconfigure the keyboard to best suit specific applications.

Our great ideas work with the IBM AT.

At IDEA, we believe that one good idea deserves another. Our products now work with the IBM AT. You can network and share resources with the AT on IDEAnet, mount our 20MB IDEAdisk internally to the AT, or connect our 5MB to 120MB IDEAdisks externally to the AT. And, of course, the new AT can communicate to IBM host computers.

Call **800-257-5027** for the IDEA dealer nearest you. You'll see why lately, IBM has been getting some great ideas from IDEA.

IDEAssociates

The best IDEAs for personal computers.

IDEAssociates, Inc., 35 Dunham Rd., Billerica, MA 01821 (617) 663-6878 Telex 94-8245,
IDEAssociates S.A., 5, Route de Chêne, CH1207 Geneva, Switzerland
(22)86.11.19 Telex 428 388 KBSCH

IBM and the IBM logo are registered trademarks of International Business Machines Corporation IRMA is a registered trademark of Digital Communications Associates, Inc
IDEAcomm 3278, IDEAcomm 3770, IDEAcomm 3780, IDEA Minicomm, IDEAcomm 5251, IDEAdisk and IDEAnet are registered trademarks of IDEAssociates, Inc.

Circle 153 on reader service card

The Help Screen

PC World offers answers and advice at every level

This month: a version of BASIC that uses up to 640K, and instructions for setting your printer's form length from either BASIC or DOS

Karl Koessel

BASIC Improved

Q. Perhaps you can help with a question that no one seems able to answer. My PC has 560K of RAM, but when I program in BASIC, I can access only 64K. When I compile a program, the compiled code seems to reside outside of the original 64K of memory, but the arrays are still subject to the 64K limit. Is there any way that I can access more than 64K with both program code and arrays?

Allan Easton
El Cajon, California

A. The core of the PC's BASIC interpreter—written by Microsoft—is almost a decade old and was originally designed for 8-bit machines that could be equipped with no more than 64K of RAM. The PC's version of BASIC uses a memory segmenting technique that enables program code to reside in one 64K segment while the data area lies in another 64K segment. This minor improvement was easily (that is, quickly and cheaply) made to the core of the old 8-bit BASIC code. But using Microsoft BASIC to access more than 64K for program or data code is no simple task.

There is an alternative, however. *Professional BASIC*, a product from Dallas-based Morgan Computing, was written specifically to use the PC's full 640K of available RAM. With *Professional BASIC*, your program can exceed 64K; the number of elements and the total size of your program's arrays are limited only by the amount of memory in your machine.

Professional BASIC includes a variety of other enhancements that can bolster a BASIC programmer's productivity. The product features character-by-character syntax checking, 8087 support, 5-digit line numbers (up to 99999), 311-character line maximums, 10-digit integers (up to 2,147,483,647), plain English, full-sentence error messages, variable and label cross-referencing, and extensive trace and debugging facilities. In addition, line numbers are optional; GOTOs and GOSUBs can reference line labels instead.

TRS-80 Printer PEEKs and POKEs

Q. While our aircraft flight department was sharing a hangar with Tandy Corporation, I had a great deal of opportunity to develop software for our TRS-80 Model III. When we moved into a hangar of our own, I ended up with a PC.

A fair amount of the old software used PEEK and POKE to track the current number of printed lines and to set the form length for printing. Where might I find this information stored in the PC? Or is there another way around the problem?

Wayne Hoffman
Fort Worth, Texas

A. The PC does not keep track of its printer. Setting the form length and the current print line are functions of the printer itself. Most printers use an Escape code sequence that enables you to set the form length, although different printers use different sequences. Similarly, most printers know the number of lines that have been

color 400

SIGMA DESIGNS' new Color 400™ makes your PC an electronic canvas. Color 400 . . . a revolutionary board for the IBM PC*, XT* and AT*. With a 640x400 resolution in non-interlaced mode, it automatically DOUBLES the number of displayed lines on standard, 200 line software. Gives you 16 vibrant colors in WordStar*. Keeps numbers and characters razor sharp in Lotus 1-2-3*, SuperCalc*, and others. And provides all points addressable graphics capability!

Voilà

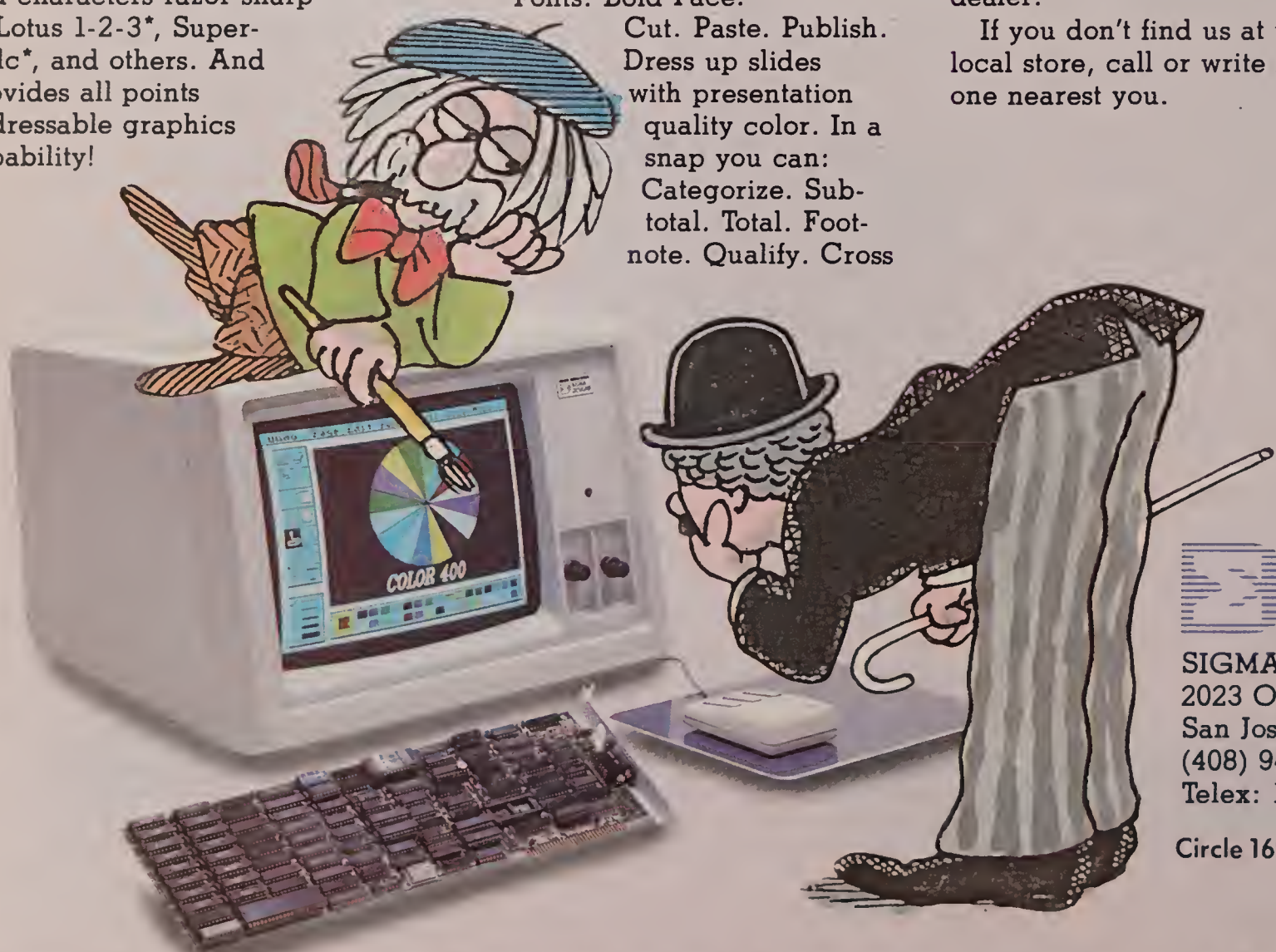
All you have to do is plug it in. There's no software to change. No switches to switch. No cables to confuse.

Just turn on your PC. Then tune into a whole new colorful world of illustration: figures, charts, graphs and symbols.

Be an artist. With PC Paint† and a PC Mouse†, you can: Paint. Draw. Shade. Print. Type. Underline. Change Fonts. Bold Face. Cut. Paste. Publish. Dress up slides with presentation quality color. In a snap you can: Categorize. Subtotal. Total. Footnote. Qualify. Cross Tab. Extend . . . and more, in a variety of highlighted colors to make spreadsheets and charts take on a new, explosive meaning.

And for maximum performance, use the Color 400 with a high resolution monitor like SIGMA DESIGNS' new CM-12™ or the Princeton Graphics' SR-12*. So, ask to see a live demonstration of the Color 400 at your nearest dealer.

If you don't find us at your local store, call or write for the one nearest you.



SIGMA DESIGNS

SIGMA DESIGNS, INC.
2023 O'Toole Avenue
San Jose, CA 95131
(408) 943-9480
Telex: 171240

Circle 169 on reader service ca

†PC Paint and PC Mouse are trademarks of Mouse Systems. Both are available with the Color 400 at an extra cost of $100 when purchased all together (a $200 savings).

*IBM PC, XT, AT are trademarks of IBM Corp. WordStar, Lotus 1-2-3, SuperCalc and Princeton Graphics SR-12 are respective trademarks of Micro-Pro, Lotus, Sorcim and Princeton Graphics.

_key?

ProKey, SuperKey, SmartKey, AlphaKey, PolyKey, DonKey, MonKey.* Peculiar macro-processors you'd be hard pressed to tell apart. They even sound the same.

Only RE/Call makes working with software simply a matter of following your own menus, as they appear, to carry out your routine tasks, while macros automate and take care of the time-consuming, error-producing details.

RE/Call has the enviable ability to

- Recall macros by choosing them off your own menus.
- Edit your menus and macros while creating them, not later in a makeshift wordprocessor window where you laboriously spell out key names, letter by letter.
- Step through your macros, one key at a time, to correct them before it's too late and all hell breaks loose.

And there's more, naturally. Such as having all features instantly available. A keyboard picture showing you your macros. The ability to fetch individual macros from your macro files. Reminder messages for fields. Automacros. And so on.

Only RE/Call brings the true power of software within reach. Including Lotus 123, Symphony, the PFS Series, Multimate and Framework.*

To experience the RE/Call effect, call 1-800-663-0373 for the name of your nearest dealer. Or, if you just can't wait, we'll take your order now. After just a short exposure, the only question you'll have is how you kept your sanity without it.

RE/Call. At $135, for IBM PCs, it's the only answer.

From YES.*

*Yes, RE/Call; Lotus 123, Symphony; PFS; Multimate; IBM; ProKey; SuperKey; SmartKey; AlphaKey; and PolyKey are trademarks of Yes Software Inc., Lotus Development Corp., Software Publishing, Multimate International, Ashton-Tate, IBM Corp., RoseSoft, Borland International, Software Research Tech., Alpha Software Corp. and Polytron Inc. respectively. DonKey and MonKey may still be available. © 1985 Yes Software Inc.

PMI

MASS STORAGE SALE!

IBM PC • XT • AT • ADD-IN/ADD-ON

• MONTHLY SPECIAL •
10MB Removable Storage Subsystem
Internal/External
CALL FOR SPECIAL PRICE

• TAPE BACK-UP FOR IBM AT, XT, PC
Complete with controller, cables & software

60MB	Half Height Internal	$1095
60MB	Half Height External	$1695
Floppy Tape — External for PC & XT		$ 995

• IBM "AT" HARD DISK UPGRADE
Fully formatted with instructions & cable

10MB	Half Height Internal	$ 549
20MB	Half Height Internal	$ 750
32MB	Half Height Internal	$1350
10MB	Removable Internal	$1145
10MB	Removable Hard Disk Only	$1095

• IBM-PC,XT HARD DISK SUBSYSTEMS
Complete with controller and cables

10MB	Half Height Internal	$ 695
20MB	Half Height Internal*	$ 995
32MB	Half Height Internal*	$1695
40MB	Half Height Internal*	$1995
60MB	Half Height Internal*	$2475
10MB	Half Height Removable Internal*	$1395
3.3MB	Half Height Superfloppy Internal	$ 695

*Requires minimum 100 watt PS

• EXTERNAL HARD DISK SUB-SYSTEMS FOR IBM-PC, XT, AT and COMPATIBLES
Complete with chassis, power supply, controller, cables, assembled & tested. 90 day warranty.

10MB	Fixed + 10MB Removable	$2450
20MB	Fixed + 10MB Removable	$2750
32MB	Fixed + 10MB Removable	$3150
65MB	Fixed + 60MB Tape	$6995
85MB	Fixed + 60MB Tape	$7495
140MB	Fixed + 60MB Tape	$8995
10MB	Removable + 10MB Removable	$2550
10MB	Fixed + 3.3MB Floppy	$2050
20MB	Fixed + 3.3MB Floppy	$2350
6.6MB	Dual Superfloppy	$1320
3.3MB	Single Superfloppy	$ 895
65MB	External	$4995
85MB	External	$5495
140MB	External	$6995

• BEST DRAM PRICE ANYWHERE!

IBM "AT" 256K Dram Upgrade			$ 270
Quantity	*1-18*	*19 +*	*73 +*
IBM-PC,XT 64K Dram 150ns	4.89	4.69	4.39
IBM-PC,XT 64K Dram 200ns	4.69	4.39	4.09

• ACCESSORIES

100% IBM Compatible Color Monitor	CALL
IBM Compatible Cabinet	$ 99
130 Watt "XT" Power Supply	$ 165
Dual Half Height Cabinet*	$ 120
Hard Disk Cabinet*	$ 275
200 Watt "AT" Power Supply	$ 225
3.3MB Diskette, 5 pack	$ 75
Multifunction Card, "OK" Ram	$ 175
AT Memory Expansion Board	$ 450
50 Pin Connector Cable	$ 30

*With power suoply

CALL FOR OUR CATALOGUE

PERIPHERAL MARKETING, INC.

30 Kneeland Street • Boston, MA 02111
(617) 435-5700

Amex, Visa, MC, Cashier's Check, Money Order. Personal check—allow 10 days to clear. Minimum shipping & handling—$3.00/first 3 lbs, plus 40¢ for each add'l lb. Mass. residents add 5% sales tax.

Prices subject to change.

Circle 960 on reader service card

printed since the top-of-form, but the PC cannot receive that information from a printer.

To set the form length in BASIC on an IBM or Epson printer, use the command

LPRINT CHR$(27);"C";CHR$(*xx*);

in which *xx* is the form length (the number of lines). To track the number of printed lines, you need to use a counter (a variable that keeps track of the lines printed) and establish increments for each line printed.

Set Form Length From BASIC or DOS

Q. For the past four years I've used a Data General CS-10 computer with two custom software programs. Now, however, I'm switching to an XT, partly because the CS-10 is no longer manufactured, but primarily because the PC's operating system offers much greater flexibility in software selection.

My problem is finding a way to use DOS to set the form feed on the Epson FX-100 printer. I'm using legal-size paper (14 inches long by 8½ inches wide) because all my files are printed in that size. The FX-100 has DIP switch settings that control some of the printer's modes but not form length. The Epson currently defaults to 6 lines per inch and 66 lines per form.

I can set the print mode and the number of characters per line using the DOS MODE command, but nowhere in the DOS 2.10 manual can I find instructions for setting the form length. The Epson manual lists a form length command, but it's in BASIC. I'd like to have such a command in DOS so I can include it in an AUTOEXEC.BAT file, automatically setting the printer every time I power up. For now, the only way I can command the correct form length is to use a Set-FX+ *program [from SoftStyle], which must be run each time I boot up—a process I find entirely too cumbersome.*

Dixon H. Cain
Houston, Texas

A. There are two quick solutions to your dilemma. The first is to create a two-line BASIC program that consists of the BASIC form length command example from the Epson manual, followed by the BASIC command SYSTEM:

```
10 LPRINT CHR$(27);"C";CHR$(51);
20 SYSTEM
```

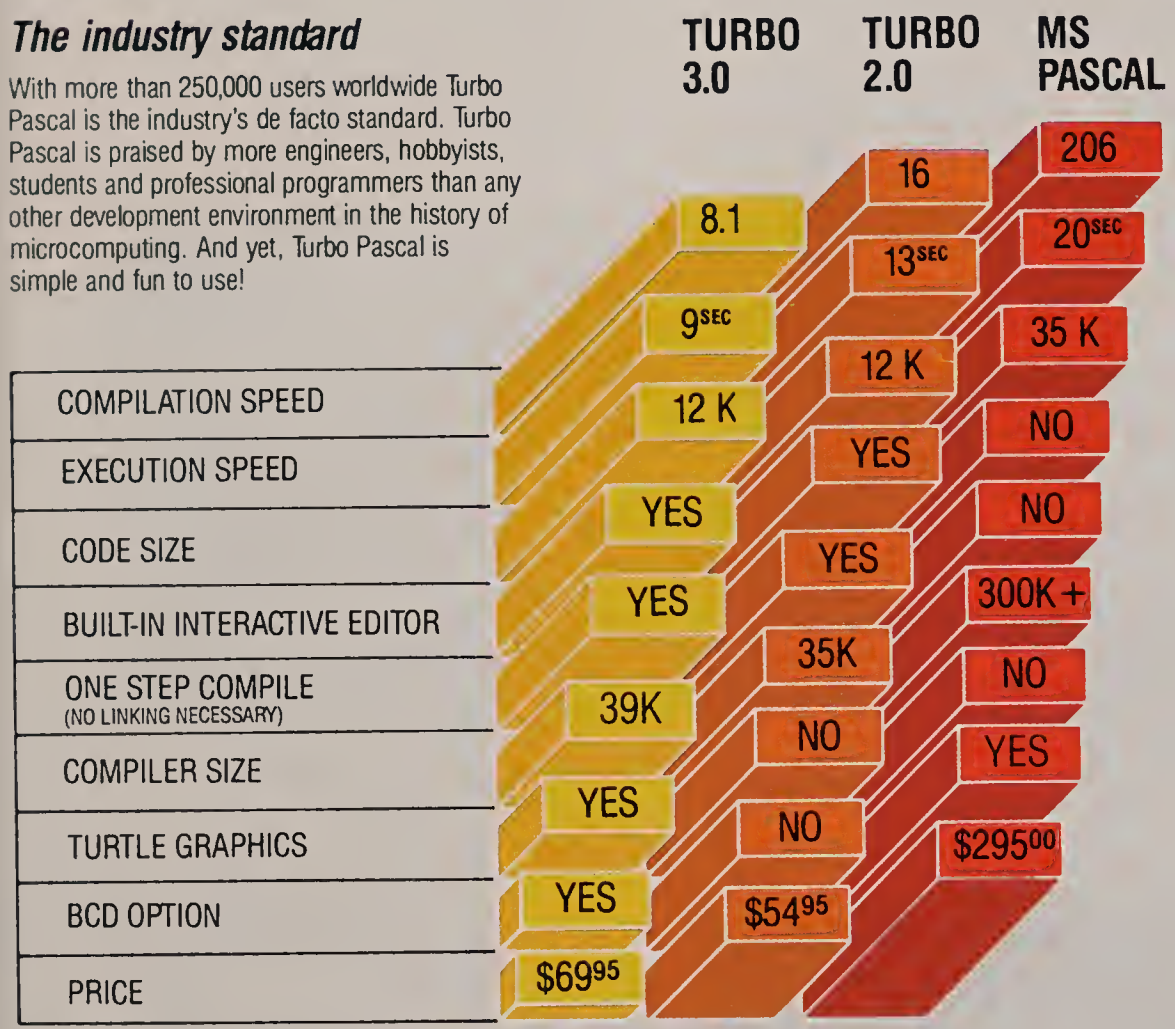
Let's assume you name the program FORMSIZE.BAS. Install BASIC and FORMSIZE.BAS on your boot disk and add the line **BASICA FORMSIZE** to the AUTOEXEC.BAT file.

MOST SIGNIFICANT PRODUCT OF THE YEAR - PC WEEK

They said it couldn't be done. Borland Did It. Turbo Pascal 3.0

The industry standard

With more than 250,000 users worldwide Turbo Pascal is the industry's de facto standard. Turbo Pascal is praised by more engineers, hobbyists, students and professional programmers than any other development environment in the history of microcomputing. And yet, Turbo Pascal is simple and fun to use!



(*) **Benchmark** run on an IBM PC using MS Pascal version 3.2 and the DOS linker version 2.6. The 179 line program used is the "Gauss-Seidel" program out of Alan R. Miller's book: *Pascal programs for scientists and engineers* (Sybex, page 128) with a 3 dimensional non-singular matrix and a relaxation coefficient of 1.0.

The best just got better: Introducing Turbo Pascal 3.0

We just added a whole range of exciting new features to Turbo Pascal:

- First, the world's fastest Pascal compiler just got faster. Turbo Pascal 3.0 (16 bit version) compiles twice as fast as Turbo Pascal 2.0! No kidding.
- Then, we totally rewrote the file I/O system, and we also now support I/O redirection.
- For the IBM PC versions, we've even added "turtle graphics" and full tree directory support.
- For all 16 Bit versions, we now offer two additional options: 8087 math coprocessor support for intensive calculations and Binary Coded Decimals (BCD) for business applications.
- And much much more.

The Critics' Choice.

Jeff Duntemann, PC Magazine: *"Language deal of the century . . . Turbo Pascal: It introduces a new programming environment and runs like magic."*

Dave Garland, Popular Computing: *"Most Pascal compilers barely fit on a disk, but Turbo Pascal packs an editor, compiler, linker, and run-time library into just 39K bytes of random-access memory."*

Jerry Pournelle, BYTE: *"What I think the computer industry is headed for: well documented, standard, plenty of good features, and a reasonable price."*

Portability.

Turbo Pascal is available today for most computers running PC DOS, MS DOS, CP/M 80 or CP/M 86. A XENIX version of Turbo Pascal will soon be announced, and before the end of the year, Turbo Pascal will be running on most 68000 based microcomputers.

An Offer You Can't Refuse.

Until June 1st, 1985, you can get Turbo Pascal 3.0 for only $69.95. Turbo Pascal 3.0, equipped with either the BCD or 8087 options, is available for an additional $39.95 or Turbo Pascal 3.0 with both options for only $124.95. As a matter of fact, if you own a 16-Bit computer and are serious about programming, you might as well get both options right away and save almost $25.

Update policy.

As always, our first commitment is to our customers. You built Borland and we will always honor your support.

So, to make your upgrade to the exciting new version of Turbo Pascal 3.0 easy, we will accept your original Turbo Pascal *disk* (in a bend-proof container) for a trade-in credit of $39.95 and your Turbo87 original *disk* for $59.95. This trade-in credit may only be applied toward the purchase of Turbo Pascal 3.0 and its additional BCD and 8087 options (trade-in offer is only valid directly through Borland and until June 1st. 1985).

NOT COPY-PROTECTED

TURBO PASCAL

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133

Carefully Describe your Computer System!
Mine is — 8 bit — 16 bit
I Use — PC-DOS — MS-DOS
— CP/M 80 — CP/M 86
My computers' name/model is:

The disk size I use is:
☐ 3½" ☐ 5¼" ☐ 8"

Name
Shipping Address:
City
State: Zip:
Telephone

For update: original Turbo disk must accompany order

YES! I want the Best!
Please send: Quantity
Pascal 3.0 $ 69.95
Pascal w/8087 $109.90
Pascal w/BCD $109.90
Pascal w/8087 & BCD $124.95 (SAVE $24.90)
• These prices include shipping to all U.S. cities. All foreign orders add $10 per product ordered
Subtotal (CA 6% tax)
Trade-in Credit Claimed
Amount Enclosed
Payment VISA MC BankDraft Check
Credit Card Expir. Date /
Card #

COD's and Purchase Orders WILL NOT be accepted by Borland. California residents: add 6% sales tax. Outside USA add $10 and make payment by bank draft, payable in US dollars drawn on a US bank

23

BORLAND INTERNATIONAL

Software's Newest Direction
4585 Scotts Valley Drive
Scotts Valley, CA 95066
TELEX 172373

Turbo Pascal is a registered trademark of Borland International, Inc.
PC Week is a trademark of Ziff-Davis Pub. Co.

Circle 954 on reader service card

Buy and sell stocks with your personal computer.

Now use your own personal computer to place stock and option orders 24 hours a day, seven days a week. Get quotes, review your portfolios and more. And save up to 75% on brokerage commissions.* For more information, call toll free today:
1-800-544-6666.
In Mass., call collect (617) 523-1919
*As compared with full-cost brokerage firms. Minimum commission is $30.00. PCC050185

FIDELITY
INVESTORS XPRESS
FIDELITY BROKERAGE SERVICES, INC.
Member NYSE. SIPC.

Circle 969 on reader service card

Keyboard	$16
Monitor	$18
Drive	$18
Monitor on Drive	$36
Printer for IBM Matrix, Epson FX/MX 80 Okidata 82, 92	$18
Printer for Epson FX-100, NEC P3, Okidata 83, 93	$20
Printer for NEC 3550	$20
Portable	$24

ComputerWear — 100% cotton canvas covers available through your local dealer or call:

Contemporary ComputerWear
1320 - 36th Avenue
San Francisco, California 94122
(415) 759-1466

Also available for: PC-AT, Televideo, Wyse, Wang, Compaq, and Macintosh.
Custom corporate logo available in quantity.

IBM is a registered trademark of IBM Corp. Dealer inquiries welcome.

Circle 276 on reader service card

A second method is to use DOS's DEBUG or EDLIN to create a file containing the printer's codes that set the form length. For example, type

EDLIN FORMSIZE < Enter >
1 < Enter >
< Ctrl > -V[C < Alt > -(51) < Enter > E

(You enter <Ctrl>-V by holding down the <Ctrl> key and pressing V. <Alt>-(51) is entered by depressing the <Alt> key, typing 51 on the numeric keypad, and then releasing the <Alt> key.)

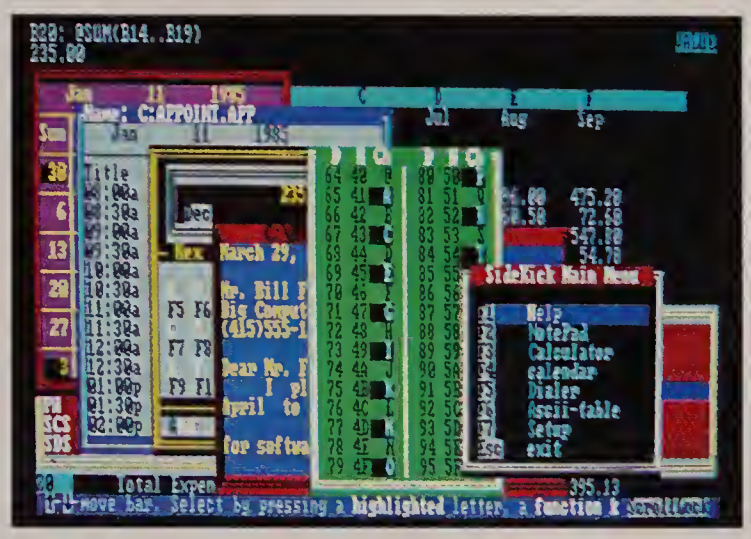
Now add the line **FORMSIZE > PRN** to the AUTOEXEC.BAT file. When you start up the XT, that line will send the contents of FORMSIZE to the printer and set the form length to 51 lines.

Do you have any questions concerning the IBM PC or compatibles? Send them to The Help Screen, PC World, *555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or The Source STE908.*

Borland's SideKick Software Product of the Year*

SideKick is InfoWorld Software Product of the Year. It won over Symphony. Over Framework. Over ALL the programs advertised in this magazine. Including, of course, all the "fly-by-night" SideKick imitations. SideKick . . . . Simply the best.

Here's **SideKick** running over Lotus 1-2-3. In the SideKick **Notepad** you'll notice data that's been imported directly from the Lotus screen. In the upper right you can see the **SideKick Calculator**.



All the **SideKick** windows stacked up over Lotus 1-2-3. From bottom to top: SideKick's **"Menu Window"**, **ASCII table**, **Notepad**, **Calculator**, **Appointment Scheduler/Calendar**, and **Phone Dialer**. Whether you're running WordStar, Lotus, dBase, or any other program, SideKick puts all these desktop accessories instantly at your fingertips.

InfoWorld Report Card 1984 by Popular Computing, Inc., a subsidiary of CW Communications Inc. Reprinted from InfoWorld, 1060 Marsh Road, Menlo Park, CA 94025.

Jerry Pournelle, BYTE: *"If you use a PC, get SideKick. You'll soon become dependent on it."*

Garry Ray, PC Week: *"SideKick deserves a place in every PC."*

Charles Petzold, PC Magazine: *"In a simple, beautiful implementation of WordStar's block copy commands, SideKick can transport all or any part of the display screen (even an area overlaid by the notepad display) to the notepad."*

Dan Robinson, InfoWorld: *"SideKick is a time-saving, frustration-saving bargain . . . ."*

NOT COPY-PROTECTED*

SIDEKICK

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133

Yes, I want the Best.
Please send me SideKick!

SideKick Copy Protected
Quantity ____ at $54.95
(CA res. add $3.30 tax per copy)

SideKick Not Copy-Protected
Quantity ____ at $84.95
(CA res. add $5.10 tax per copy)

These prices include shipping to all U.S. cities. All foreign orders add $10 per product ordered

PCjr requires not copy-protected version

Amount (CA 6% tax) ____
Payment VISA MC BankDraft Check
Credit Card Expir Date ____/____
Card # ____

Name ____
Shipping Address ____
City ____
State ____ Zip ____
Telephone ____

S23

COD's and Purchase Orders WILL NOT be accepted by Borland. California residents add 6% sales tax. Outside USA add $10 and make payment by bank draft, payable in US dollars drawn on a US bank

BORLAND INTERNATIONAL

Software's Newest Direction
4585 Scotts Valley Drive
Scotts Valley, CA 95066
TELEX 172373

Symphony, Lotus & Lotus 1-2-3 are trademarks of Lotus Development Corp. dBase & Framework are trademarks of Ashton-Tate. WordStar is a trademark of Micropro International Corp. SideKick is a trademark of Borland International.

*Selected by *InfoWorld* as the most significant software product of the year.

Circle 760 on reader service card

SuperKey
ROBERT
B. TINNEY

Borland Does It Again: SuperKey $69.95

Sure, ProKey™ is a nice little program. But when the people who brought you Turbo Pascal and SideKick get serious about keyboard enhancers, you can expect the impossible . . . and we deliver.

	SuperKey	ProKey
ALL FEATURES RESIDENT IN RAM AT ALL TIMES	YES	NO
RESIDENT PULL-DOWN MACRO EDITOR	YES	NO
RESIDENT FILE ENCRYPTION	YES	NO
PROKEY COMPATIBILITY	YES	YES
DISPLAY PROTECTION	YES	NO
ABILITY TO IMPORT DATA FROM SCREEN	YES	NO
PULL-DOWN MENU USER INTERFACE	YES	NO
CONTEXT-SENSITIVE ON-LINE HELP SYSTEM	YES	NO
DISPLAY-ONLY MACRO CREATION	YES	NO
ENTRY AND FORMAT CONTROL IN DATA FIELDS	YES	NO
COMMAND KEYS REDEFINABLE "ON THE FLY"	YES	NO
PRICE	69.95	129.95

Total ProKey compatibility. Every Prokey Macro file may be used by SuperKey *without change* so that you may capitalize on all the precious time you've invested.

Now your PC can keep a secret! SuperKey includes a resident file encryption system that uses your password to encrypt and decrypt files, even while running other programs. Two different encryption modes are offered:

1. Direct overwrite encryption (which leaves the file size unchanged) for complete protection. At no point is a second file that could be reconstructed by an intruder generated. Without your secret password, no one will ever be able to type out your confidential letters again!

2. COM or EXE file encryption which allows you to encrypt a binary file into an ASCII file, transmit it through a phone line as a text file and turn it back again into an executable file on the target machine (only of course if your correspondent knows the secret password!). Now, you will even be able to secretly exchange programs through Public Bulletin Board Systems or services such as CompuServe.

Totally memory resident at all times, gives SuperKey the ability to create, edit, save and even recall new or existing macro files anytime, even while running another program.

Pull down macro editor. Finally, a sensible way to create, edit, change and alter existing macro definitions. Even while using another application, a simple keystroke instantly opens a wordprocessor-like window where you're allowed to see, edit, delete, save and even attach names to an individual macro or file of macros, and much more.

NOT COPY-PROTECTED

SuperKey

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133

$69.95

This price includes shipping to all U.S. cities. All foreign orders add $10 per product ordered

YES! Please rush SuperKey to me. Send me ____ copies.

Subtotal ____
(CA res. add 4.20 tax per copy) ____
Amount Enclosed ____
Payment VISA MC BankDraft Check
Credit Card Exp. Date ____/____
Card # ____

Name ____
Shipping Address ____
City ____
State ____ Zip ____
Telephone ____

COD's and Purchase Orders WILL NOT be accepted by Borland. California residents add 6% sales tax. Outside USA add $10 and make payment by bank draft, payable in US dollars drawn on a US bank

K23

Sorry ProKey !

Superb software at reasonable prices!
There is much more to SuperKey. Maybe the best reason to buy SuperKey is that it is a Borland International Product. Each one of our products is the best in its category. We only believe in absolutely superb software at reasonable prices!

An offer you can't refuse.
Whether you are a ProKey user or you've never used a keyboard enhancer before, your boat has come in. You can get your copy of SuperKey at this irresistible price.

Get your PC a SuperKey today!
SuperKey is available now for your IBM PC, XT, AT, jr. and truly compatible microcomputers.

BORLAND INTERNATIONAL

Software's Newest Direction
4585 Scotts Valley Drive
Scotts Valley, CA 95066
TELEX 172373

IBM is a registered trademark of International Business Machine Corporation. ProKey is a trademark of RoseSoft. SuperKey and SideKick are trademarks of Borland International, Inc. CompuServe is a trademark of CompuServe Corp.

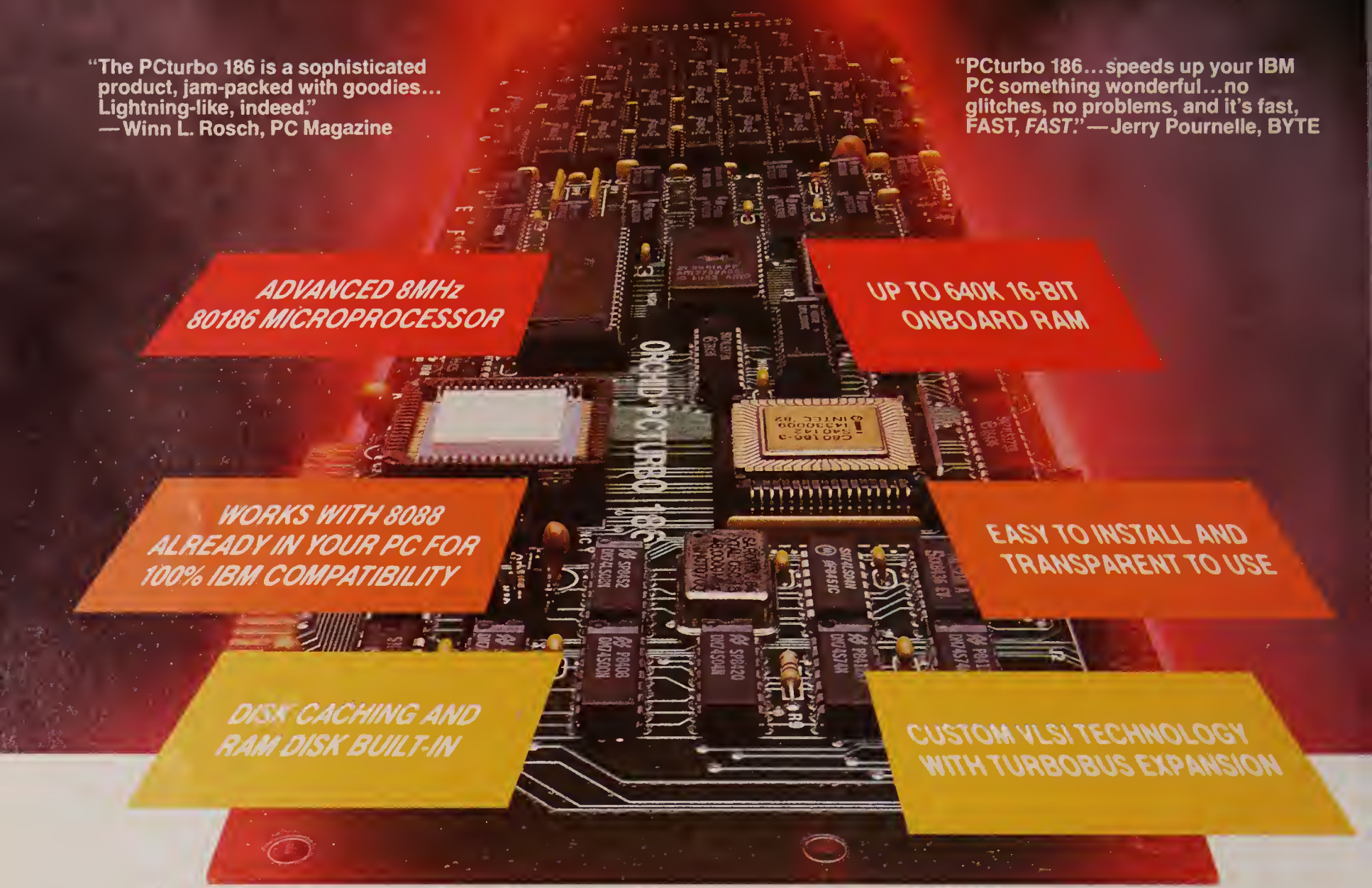
Circle 955 on reader service card

IT SCREAMS!

PCturbo 186™

"The PCturbo 186 is a sophisticated product, jam-packed with goodies... Lightning-like, indeed."
—Winn L. Rosch, PC Magazine

"PCturbo 186...speeds up your IBM PC something wonderful...no glitches, no problems, and it's fast, FAST, *FAST*."—Jerry Pournelle, BYTE



EXTENDS THE LIFE OF YOUR COMPUTER ▪ SPEEDS UP YOUR EXISTING PC ▪ FINISHES JOBS FASTER

Now from Orchid Technology—**PCturbo 186,** the most practical solution to upgrading the performance of your existing IBM PC, XT or compatible. Based on the new generation 80186 processor, the PCturbo 186 runs your application programs, such as databases and spreadsheets 200% to 400% faster.

Plugged into your PC, the PCturbo works together with the computer power you already own today. Unlike less powerful imitations, **the PCturbo works in tandem with the 8088 in your PC.** It does not replace it. In this design, the 8088 handles all the peripheral I/O while the PCturbo runs your programs concurrently and more efficiently.

The PCturbo is a high speed *system*, with **built-in software tools** designed to increase all aspects of computer performance. Innovative software allowed Orchid to enhance the PCturbo with many powerful features, such as Mainframe style **Disk Caching** and high capacity **RAM Disks**, speeding up the reading and writing of files.

To help take advantage of those powerful software tools, the PCturbo allows you to add up to 640K of its own RAM on board. With PCturbo you can now have up to **1.28 Megabytes of RAM in one system**—double the previous limit of the IBM PC! This frees the extra RAM in your PC to be used for increasing I/O performance.

With the PCturbo there are no new Operating System manuals to read, keyboards to learn, or special software versions to buy. When you plug the PCturbo board into your IBM PC or compatible PC, everything works just like it did the day before—only faster! The PCturbo was designed to be easy to install and transparent to the user. Installation does not void the warranty on your PC, as with some other offerings. **Just plug it in, turn it on, and speed it up!**

The PCturbo is a proven product, introduced in 1984. Since then, we've created a custom VLSI (Very Large Scale Integration) chip which improves the cost/performance ratio of the board even more. Our exclusive TurboBus Expansion capability allows you to add on new Turbo options such as the Serial Port Daughtercard. Continuing in our tradition, Orchid is first with the most in high performance PC enhancements.

PCturbo 186 is the most practical solution to making your operation more efficient and productive. **Now isn't that what you bought a computer for in the first place?**

ORCHID

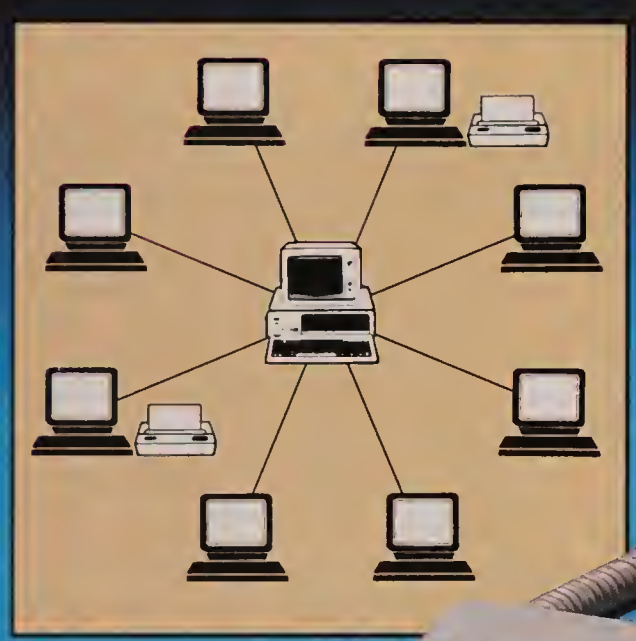
ORCHID TECHNOLOGY
47790 Westinghouse Drive
Fremont, CA 94539
(415) 490-8586 Telex: 709289

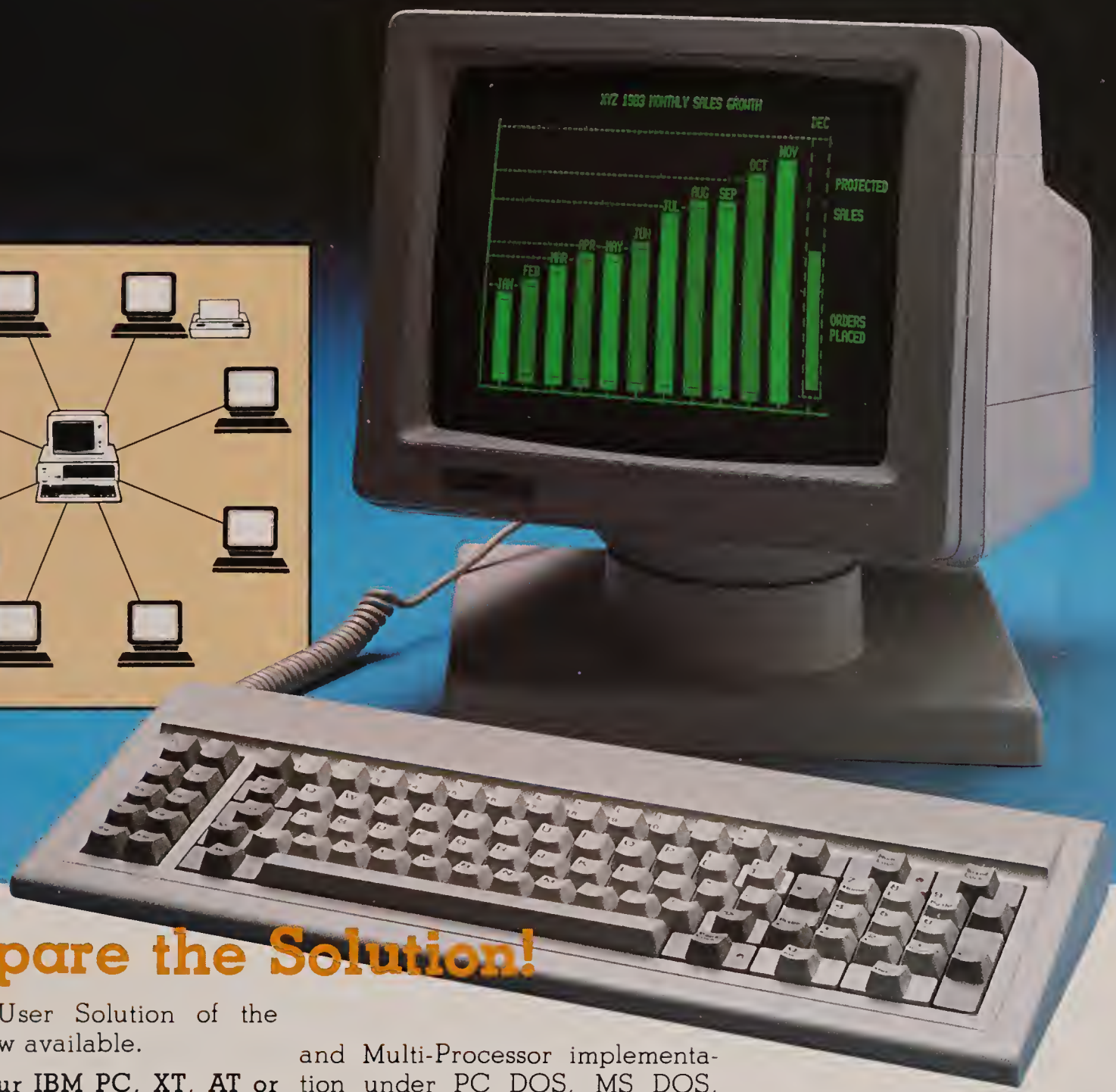
PCturbo 186 is a trademark of Orchid Technology. IBM and IBM PC are trademarks of International Business Machines Corporation.

Circle 133 on reader service card

Kimtron

MULTI-USER SOLUTION for IBM PC, XT, AT





Compare the Solution!

The Multi-User Solution of the future is now available.

Convert your IBM PC, XT, AT or Compatibles to a true multi-user system while maintaining display, keyboard and software compatibility.

Since the KT-7/PC display is the same as your PC monochrome monitor, with its look-alike keyboard, operators will feel they're using an IBM PC and can also use the same software manual. Kimtron's multi-user solution includes file and record locking, shared data access, and communication between users. It is **the** intelligent alternative.

The KT-7/PC supports Time Sharing, Enhanced Time Sharing and Multi-Processor implementation under PC DOS, MS DOS, UNIX, XENIX, CPM 86, Multilink, Concurrent PC DOS, and other compatible multi-user operating systems.

Kimtron's multi-user solution may be tailored for cost effectiveness; as low as $1095 for an additional user, and for speeds more than ten times faster than LAN. You can add one or as many as 31 additional users per PC. Kimtron delivers the future now by allowing an ever-widening network of multi-user PC's.

The KT-7/PC may be complemented with one (or more) I/O Card, Memory Card, 8086 Speed Enhancer Card, 80286 AT Card, 8088 Multi-Processor Card, 80186 Speed Enhancer Card, 68000 Card, and related software.

For more information about Kimtron's Multi-User Solution, or general video data terminals for other mini or micro multi-user systems, call your local computer dealers, distributors or Kimtron Corporation Today!

(408) 286-8790

1705 Junction Court
Building #160
San Jose, CA 95112

Kimtron

NOTE: IBM PC, XT, AT, PC DOS, MS DOS, UNIX, XENIX, CPM 86, Multi-Link, Concurrent PC DOS are registered trademarks of IBM Corporation, Microsoft Corp., Bell Labs., Digital Research Inc., Software Link Inc. respectively.

See us at Comdex Spring Booth #4636

Circle 941 on reader service card

PC WORLD

An Old-Timer Reminisces

The president of the Boston Computer Society ruminates about the past, present, and future of personal computing.

The year was 1976. A tumultuous, divisive war on a distant continent had finally come to an end, and the Oval Office high jinks of a notorious administration were history. A nation eager to drown its cares exulted in the excesses of the Bicentennial and looked forward to a less troubled future.

But for 13-year-old Bostonian Jonathan Rotenberg, the immediate future held more frustration than promise. Rotenberg had convinced his high school to replace its $3000-a-year teletype time-sharing service with a build-it-yourself Altair personal computer. While soldering together that primitive machine, Rotenberg realized that he was on his own—information about personal computers in 1976 was about as common as atheists in foxholes.

Goaded by frustration and a growing interest in computers, Rotenberg formed the Boston Computer Society (BCS), a nonprofit organization dedicated to gathering and sharing computer information with the public. The now wizened 22-year-old Rotenberg notes that when he chaired the BCS's first meeting in January 1977, he had no idea he was making history.

In a world where computer user groups have an average lifespan of three to four years, the BCS is something of an anomaly. The BCS turns 8 this year and boasts a 12,500-member roster spanning 50 states and 20 countries. The society acts as an umbrella organization for more than 40 computer-specific and special interest groups that operate from the society's headquarters in Boston's Government Center district. In addition to publishing a monthly calendar and magazine, *Computer Update*, the BCS sponsors more than 50 events and meetings each month. It has also joined forces with the Boston Computer Museum to develop exhibitions and educational programs for the museum's Discovery Center. More important, companies such as Apple and IBM take the society seriously: both the Apple Macintosh and IBM's Portable PC were first publicly demonstrated at the BCS.

Of course, the BCS wasn't always so highly respected. Rotenberg held the club's first meeting in his high school's library. As Rotenberg remembers, "Two people showed up—and one was studying late and didn't know what was going on." But in typical success story fashion, the BCS persevered and prospered, much like the industry whose growth it mirrored. One element has remained constant: Rotenberg, who held the BCS's first meeting wearing braces on his teeth, is still in charge.

"From the beginning I've felt strongly about demystifying the technology and providing service to the public," says Rotenberg. His position as founder of a consumer organization, rather than of a hardware or software company,

PC World View *reports new developments in computer technology, items of interest to computer enthusiasts, and the most significant and enticing speculation about industry trends and personalities. We've reserved the "Grapevine" section of this column for industry reports that are still at the speculative stage.*
—Katie Seger

View

News and notes for the computing community

From soldering iron to computer fame: Jonathan Rotenberg, prognosticator and head of the Boston Computer Society, ponders the future of computing—and the possibilities of a million club members.

gives him a unique perspective on the microcomputer industry. (Although Rotenberg has never collected a salary from the BCS, he is not completely altruistic—he earns a cool $3000 per day as a consultant for companies such as Softcon producer Northeast Expositions.)

Rotenberg regrets some of the changes the personal computer business has undergone. "A lot of the fun has disappeared. The newness, the excitement, the feeling of

(continues on page 60)

An Old-Timer Reminisces
(continued from page 59)

pioneering have been replaced with a bottom-line mentality and, unfortunately, very predatory tactics." He compares the personal computer industry to the turn-of-the-century automobile business; once the automobile caught on, the hundreds of independent manufacturers were eventually bought out–or pushed out–by a few big companies. "It's something that every industry goes through. You have a situation with a lot of companies fighting for a market that is only going to support a few of them."

However, says Rotenberg, economic theories "don't give you a sense of the personal tragedies–the personal bonds and camaraderie that have been ruined along the way. Originally Apple made computers. Software Arts developed application software, which was marketed by VisiCorp, while Microsoft made operating systems," he explains. "Those four worked together in harmony; everyone helped everyone else. As they grew and expanded, they began to move in on each other's turf. Suddenly they found themselves competing with each other."

Despite the recent industry shakeout, Rotenberg foresees good things for consumers as 8-bit personal computers give way to 16-bit machines, such as the PC, and to newer 32-bit computers like the Macintosh. Rotenberg's own future is still an unknown. While he admits that the BCS could survive without him, he has no plans to leave the society in the near future. He speaks of turning the BCS into a truly national organization–"the AAA of the computer world." Such expansionist thoughts are still mostly talk, but Rotenberg has learned to think big. As he modestly asserts, "We have the potential to gain 1 to 2 million members in the United States alone."

Grapevine

When it comes to guarding its secrets, IBM rivals the CIA for diligence. Big Blue is particularly fussy about new product information. When details about a new machine finally do leak out, the trickle of information often comes from the lips of an unimpeachable source (read: IBM). The finely chiseled rumor is passed to an anonymous industry insider, who in turn shuttles the dope to the *Wall Street Journal*, or in this case, to *PC World*.

Our own anonymous industry insider contends that IBM plans to bring out a portable AT sometime this year. Given the increasing availability of compact hard disks and the AT's Sasquatch-size footprint, this would not be a surprising development. A lap computer featuring a plasma display is also in the works. Plasma displays offer near-photographic-quality images and, naturally, high-resolution character and graphics display. IBM has been making plasma displays for its mainframe terminals since the mid-1970s; the IBM PC Information Panel, a plasma display and adapter for the PC and the XT, was released in November 1984. Although plasma displays offer superior resolution, they are also likely to inspire sticker shock. (For example, the Information Panel monitor and adapter cost dealers $3410.) This stiff price has precluded their use in lap-size computers, which have thus far relied primarily on liquid crystal displays.

Our source has also heard rumblings that IBM is planning a machine based on Intel's yet-to-be-released 32-bit 80386 microprocessor for sometime in 1986. Such a lightning-fast computer will likely use optical disk storage–which ties in nicely with IBM's recently rumored acquisition of almost 1 million 5¼-inch optical disk drive units.

Flying High

What's black and red and flies all over? The Aerobie, the latest invention from Alan J. Adler. This flying ring, which holds the world record for the "longest thrown inert object heavier than air" (according to the *Guinness Book of World Records*), was developed with the help of the inventor's IBM PC.

During the design process Adler relied on his PC and a BASIC simulation program he wrote to calculate the weight and aerodynamic stability of different plastic ring designs. The program reduced the number of prototype molds required, saving time and money.

The 46-year-old Adler isn't always tinkering in his computerized workshop. In real life he is a consultant and part-time Stanford University engineering lecturer. Adler turned to toy designing because "all my life I've designed products like high-rate tape recorders that I won't use." Keep flying.

Frisbee resuscitatus: Alan Adler takes the flying disk into the next century—and the record books—with the help of his PC.

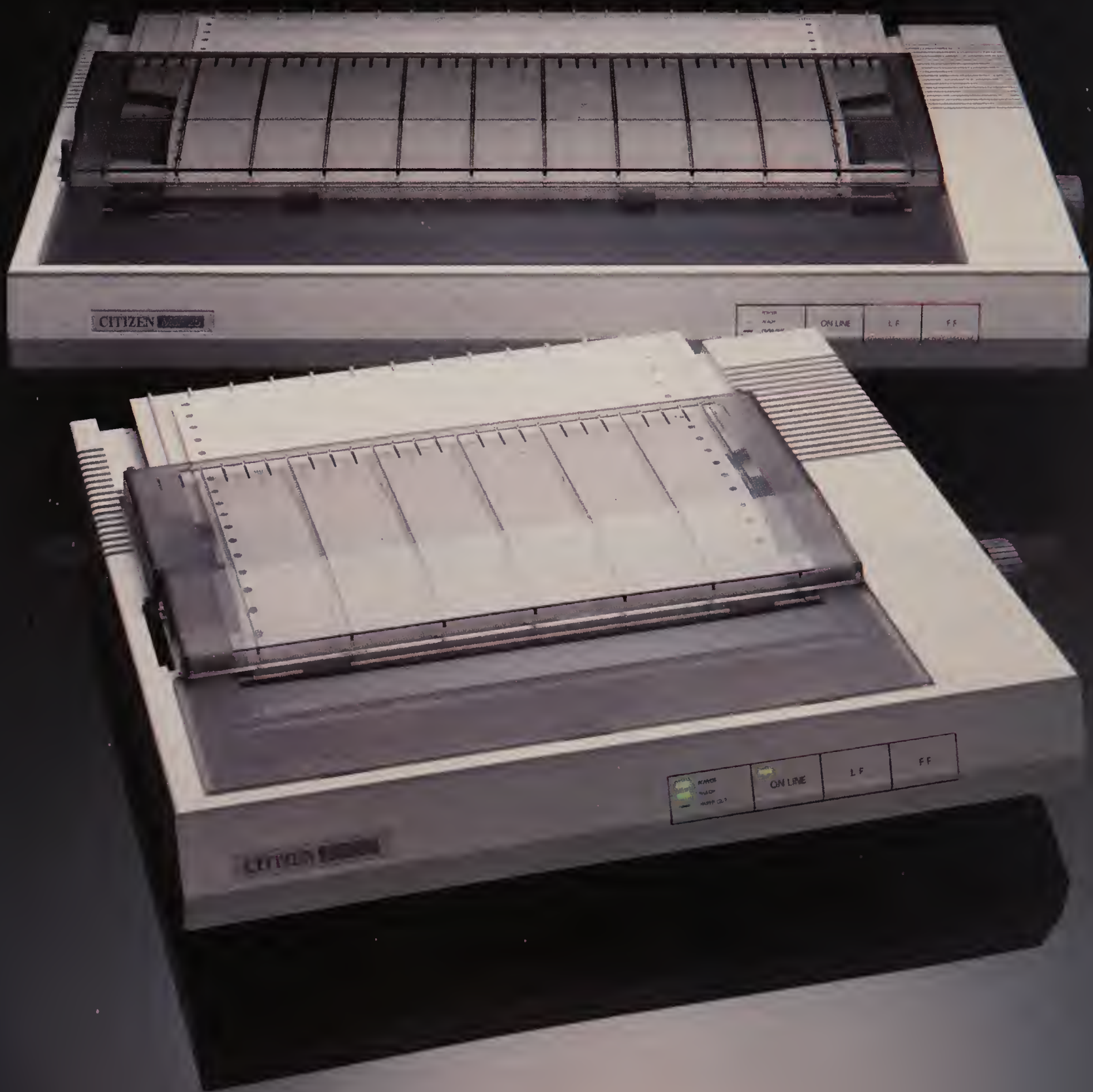
Big Blue's News

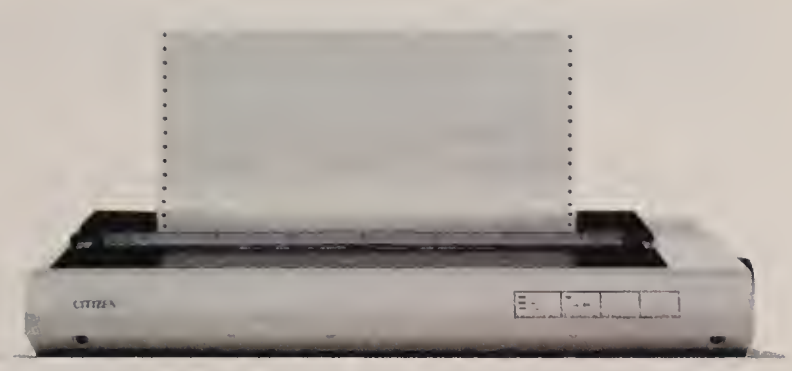
In its brief life the PC AT has had its share of troubles. Industry analysts have suggested that to placate anxious dealers and head off possible antitrust actions, IBM pushed the AT out the door before the company or the machine was ready. IBM has ruefully discovered the effects of this prematurity: escalating demand for the AT has yet to be matched by the company's assembly lines. Big Blue has fueled dealer consternation by informing them that "due to component shortages and demand," first-quarter allocations for the enhanced AT would not be met. To complicate matters, reports of technical troubles—especially with the 20MB hard disk used in enhanced AT models—are beginning to surface. IBM is wisely looking for other companies to augment supplies from Computer Memories, of Chatsworth, California—currently the only source for the AT's hard disk.

An IBM spokesperson would not speculate on AT availability for the second quarter of 1985, but did deny technical troubles

(continues on page 64)

CITIZENS OF THE YEAR.





To become a highly respected Citizen, it takes outstanding performance and faithful public service.

Introducing the two newest Citizen™ dot matrix printers. Engineered with the same care and precision we've built into Citizen watches for over 50 years.

Fast? The MSP-20 and MSP-25 both print an incredible 200 cps, or 50 cps correspondence-quality at the flick of a switch. Quiet? You'll hardly know they're on.

And both feature proportional spacing for hard copy so clean, you'd swear it didn't come from a dot matrix. Plus, all Citizen printers are IBM®- or Epson®-compatible. All feature our easy-to-use push-feed paper loading system. And all come with the industry's longest warranty—18 months on parts and labor. Which can only mean one thing:

Citizens of the year are built to be Citizens of the years.

For more information, call 1-800-556-1234, Ext. 34. In California, 1-800-441-2345, Ext. 34. Or write Citizen America Corporation, 2425 Colorado Avenue, Santa Monica, CA 90404.

CITIZEN™

© 1984 Citizen America Corporation
Citizen and the Citizen logo are trademarks of Citizen America Corporation. IBM is a registered trademark of International Business Machines Corporation. Epson is a registered trademark of Epson Corporation

Circle 999 on reader service card

Big Blue's News
(continued from page 61)

with the unit's hard disks. "Warranty claims aren't out of the ordinary," the spokesperson said. Nonetheless, one company–Interactive Data Corporation of Waltham, Massachusetts–has rushed in to patch the holes IBM would rather ignore. The company claims its $149 *DFixer* program will identify bad sectors on the AT's hard disk and instruct the machine to avoid them.

The AT's delayed shipments and hard disk ills will probably mean bigger profits for companies such as Compaq and Tomcat Computer, which produce comparable computers. According to Michael S. Swavely, Compaq's director of marketing, his firm is pleased with sales figures for its 8086-based DeskPro computer–but he quickly adds that the AT's troubles "give us even more opportunity" to boost sales. Swavely couldn't resist reminding us that Compaq has offered a 30MB hard disk version of the DeskPro since October 1984.

Competition from Tomcat Computer, a 9-year-old Japanese company, may also cut into the AT's early sales if Tomcat can bring its AT-compatible 3200-AT computer to market. At press time the 80286-based machine had not yet reached American shores, but Tomcat's president, Ken Inouye, anticipates his company will be shipping as many as 4000 machines a month by spring of 1985.

Tomcat will initially manufacture the 3200-AT in Japan, but the company is searching for a U.S. manufacturer as well. Inouye says he would welcome partnership with a company such as Columbia Data Products, even though PC-compatibles makers are weathering tough financial times. Such a

We're Off To See the Wizard

If C. Itoh Digital Products' new advertising plan elicits some chuckles, Gene Murphy will be pleased. Murphy, Digital Products division vice president of marketing and sales, is behind the new campaign, which features characters from the Johnny Hart and Brant Parker comic strip "The Wizard of Id." "The biggest problem with hardware advertisements," says Murphy, "is that the ads are all hardware. There's no warmth." When C. Itoh's advertising agency suggested using the cartoons, Murphy wholeheartedly agreed.

The Wizard, the King, Rodney, the Town Crier, and the rest of the medieval gang started touting C. Itoh's products last fall. "The ads get our message across, but we can be a little bit outrageous because the characters are speaking," says Murphy. The strip's residents aren't found only in print ads; C. Itoh has incorporated the cartoon theme into its posters, brochures, dealer-support material, and, notably, point-of-purchase printer stands disguised as castle turrets.

"We seem to be able to adapt our characters to the form," says cartoonist Hart. Hart should know, having adapted his solo comic strip, "B.C.," to fit Pitney-

marriage is not all that unlikely; Corona Data Systems has been making unlabeled PC compatibles for companies ranging from Olivetti to Wordplex. Apparently, U.S. and Japanese automobile companies have set a precedent in American/Asian joint ventures.

In spite of its troubles and its competitors, the AT will no doubt find its way onto many desk tops. But the machine's delay does give Compaq, Tomcat, and others a little more breathing space. And when you're competing with IBM, you need every deep breath you can get.

Bowes advertisements. As with "The Wizard of Id," Hart pens the ballooned dialogue and Parker creates the drawings for the C. Itoh ads. Hart jokes that some C. Itoh printers are faster than he is—the ProWriter 8510 Printer, for example, can print up to 180 characters per second. Adds Hart, "It's a good day when I do one character per hour."

PC World View *welcomes contributions from readers, and we'll pay up to $50 for the items we use. Please include your name, address, and phone number with your contributions; send them to* PC World View, PC World, *555 De Haro St., San Francisco, CA 94107.*

You're in Good Company When You Program in BetterBASIC

All of these companies rely on BetterBASIC to write their software programs. They have found that BetterBASIC combines the features they need from BASIC, Pascal, C and Forth in one familiar environment. Some of these features include the following.

640K Now you can use the full memory of your PC to develop large programs.

STRUCTURED Create well organized programs using procedures and functions that are easily identified and understood and completely reusable in future programs.

MODULAR Use procedures and functions grouped together to form "library modules."

INTERACTIVE BetterBASIC acts like an interpreter, responding to the users' commands in an immediate mode. However, each statement is actually compiled as it is entered.

EXTENSIBLE Create your own BetterBASIC modules which contain BetterBASIC extensions (ideal for OEMs).

COMPILED Each line of the program is compiled as it is entered into the computer's memory rather than interpreted at runtime. The optional Runtime System generates EXE. files.

BetterBASIC Runs on IBM PC, IBM PC/XT and compatibles.

CALL 1-800-225-5800 Order Better BASIC now, or write Summit Software Technology, Inc.™, P.O. Box 99, Babson Park, Wellesley, MA 02157. Prices are listed below.

BetterBASIC: $199 Runtime System: $250
8087 Math Module: $99

Still not convinced? Order the BetterBASIC sample disk which includes a demo, a tutorial, compatibility issues, 50 lines of BetterBASIC and more. Only $10.

MasterCard, VISA, P.O. Checks, Money Order, C.O.D. accepted.

BetterBASIC is a registered trademark of Summit Software Technology, Inc.

IBM PC and IBM PC/XT are registered trademarks of International Business Machines Corp. Tandy is a registered trademark of Tandy Corp. Illustrated above are registered trademarks of the following companies: Mobil Oil Corp.; A T & T; General Electric Co.; Westinghouse Electric Corp.; TRW, Inc.

Better BASIC™

ALSO AVAILABLE FOR THE TANDY 2000, 1200 AND 1000

Circle 890 on reader service card

International Connections

With the industry's most popular data communications program, the world is at your command.

An import/export office in New Jersey can instantly check the London market for current dollar exchange rates ... send Hong Kong an updated production schedule ... print-out the week's sales results from the Dallas branch.

There's virtually no limit to how far you can reach with your microcomputer, ordinary telephone lines, and CROSSTALK.

Even if your own business and personal needs are closer to home, you'll appreciate CROSSTALK's compatibility with a wide user base ... smart terminal characteristics ... total modem control ... and the ability to capture data at a high speed for later off-line editing. CROSSTALK has extras you may not find in other programs. Data capture to memory buffer (and on-line display). Protocol error-checking file transfer. Modem/telephone hangup, and display of elapsed time of call. Command file power and flexibility. Remote takeover and operation. And much more.

There is a CROSSTALK version for almost every CP/M, CP/M-86, or IBM DOS based microcomputer system. See your dealer, or write for a brochure.

CROSSTALK

MICROSTUF®

1000 Holcomb Woods Parkway / Roswell, Georgia 30076

CROSSTALK is a trademark of Microstuf, Inc., CP/M and CP/M-86 are trademarks of Digital Research, Inc., IBM is a trademark of International Business Machines, Inc.

Circle 275 on reader service card

Check this combination of new functions, ease of operation, speed and price!

Take a close look at the comparison chart below and you'll quickly see how Genoa's unique and powerful software provides the critical elements that you've been waiting for in a hard disk/tape backup system for your IBM® PC, XT,™ AT™ and compatibles.

Multi-window, multi-function displays, including the on-line simple Help Menu, the mouse-like Command Input and the intelligent command line editor enable the average user to operate this system in an easy, straightforward manner, getting help, if needed, from the screen—not the manual. Toggling between DOS and tape menus saves valuable time in every application.

Backup 20 mb in less than 5 minutes.

The Galaxy's speed, and the combination of Backup/Restore capabilities, is unmatched by any other tape backup subsystem available today. The system is fully network compatible and easily installed in less than 15 minutes. All Genoa hard disk subsystems, whether stand-alone or in combination with tape, include the correction for DOS 2.0 problems, a media defect map on the supplied diskette, and allow you to use the entire disk under DOS 2.0, 2.1 and 3.0. In addition, Genoa offers disk/tape drive interchangeability, which enables you to backup data from one hard disk and restore to another using Genoa's proprietary software.

20 MEGABYTE HARD DISK/TAPE CARTRIDGE SYSTEMS

	Genoa Galaxy 3120	Tallgrass TG-3020 TG-09	Allay PC Qicstar	Sysgen XL	Mountain 01-4000-03
Multi Window, Multi Function Displays	✓				
On-line Help Menu Window	✓				
DOS/Tape Utility Toggling	✓				
Mouse-like Command Input	✓				
DOS-like Tape Directory Commands	✓				
Backup/Restore Time & Percentage Indicator	✓				% only
Image Backup/File by File Restore with Directory Display	✓				✓
File by File Backup/Restore by Directory or Subdirectory	✓	✓	✓	✓	
File by File Backup/Restore by Date or Last Modified	✓	✓	✓	✓	
File by File Backup/Restore with Appending & Exclusion	✓		✓		
File by File Restore to any Directory	✓				
Warranty	1 YEAR	6 mo.	90 days	90 days	6 mo.
Price	$3295	$3144	$4595	$3295	$4495

The Genoa product line now includes graphics controller boards as well as internal and external models of hard disks and tape backup systems—each in stand-alone or combination configurations. They are designed for use with the IBM® PC, XT,™ AT™ and compatibles.

See your local dealer or call toll free for details.

1-(800) 325-0874 Outside Calif.
(800) 824-8372 Inside Calif.

Dealer inquiries invited.

Genoa SYSTEMS CORPORATION

73 E. Trimble Road · San Jose, CA 95131
(408) 945-9720

Trademarks/Owners: IBM is a registered trademark, AT and XT are trademarks of International Business Machines Corporation. Genoa Galaxy is a trademark of Genoa Systems Corporation.
The comparison chart was prepared by Genoa Systems Corporation based upon information obtained from the companies named in the chart during the week of December 10, 1984

See us at Spring Comdex Booth #5208

Circle 994 on reader service card

You can wait years for IBM to offe
Or you can buy them

See PC-QICTAPE, PC-STOR, PC-SLAVE/16, PC-QICSTO
and the other innovative All

 Alloy Computer Products, Inc., 100 Pennsylvania Ave., Framingham, Mass. 01701 (617) 875-6100, TWX: 710-346-0394 Euro

hese high performance products.
oday from Alloy.

CSTOR-PLUS, PC-DISC, PC-BACKUP, PC-CARD, PC-9 TRACK
oducts in action at your local dealer.

loy Computer Products (Europe) Ltd., Cirencester, Gloucestershire, England Tel: 0285-68709, Tlx: 43340

Circle 315 on reader service card

ALLOY
Computer Products, Inc.

Compatibles Update

The latest developments in the PC-compatibles marketplace

This month: how to succeed in business by avoiding retail, one major retailer tries Europe, and a way to turn a Kaypro into a PC compatible

Edited by Ken Greenberg

Trends

Going Underground

"Retail is the lowest-cost channel of distribution for this business. Retail is the biggest part of the market—and the most important."
—William Murto, cofounder of Compaq Computer

IBM breathes heavily—cuts a few prices here, sues a few companies there—and small fry teeter. Put generously, it's unrewarding to seriously challenge IBM once it has market share.

The salient question for 1985 remains, how do you pay fealty to MS-DOS, elude the Big Blue juggernaut, and still turn a profit?

Increasingly, boutique PC-compatibles manufacturers are taking steps to write off retail. (The thinning of the retail ranks is also proceeding apace, but that's another story.) Nothing is as it seems anymore; even those machines remaining on your local dealer's shelves tend not to be wearing their original logos. There's now a concerted move among remaining clone makers to go underground, which is typically where the survivors of a war can be found.

In the PC-compatibles business, going underground is spelled O-E-M (original equipment manufacturer) or V-A-R (value-added reseller). The OEM business requires that the PC-compatibles manufacturer—say, Corona Data Systems—act as a sort of ghostwriter for the mainframe maker—say, Sperry—which puts its label on the Corona machine and is thus spared the time and trouble of designing its own PC clone. (At press time, the two companies were reportedly cooking up an AT compatible as well.) It's what you call a "win-win" situation for both firms.

The VAR sector is marked by heavy traffic in souped-up machines. Compatibles are sold to "re-marketers," whose sole purpose is to enhance the units with service, hardware, and/or software—often vertical market applications—and then resell them.

Both the OEM and VAR markets are lucrative distribution channels for companies rebuffed by retail. While these channels are hardly new, they've achieved new prominence as everybody runs for cover.

Corporate players like Sperry have helped turn PC compatibility into a commodity business: just buy the technology from someone else and stick your label on it. There lie the incentives—and the best niches—for the smaller manufacturers. One of them—OEMTEK, of San Jose, California—is offering PC compatibility like clothes off the rack, at 20 to 30 percent below IBM's retail prices.

Fueled in February 1983 by $4 million in venture financing, OEMTEK decided at the outset that it would be futile to compete for scarce retail shelf space. Instead, the company opted to forfeit name-brand recognition in favor of reaching users via well-heeled corporate buyers who seek PC compatibility.

As the name implies, OEMTEK stands apart by virtue of its decision to relinquish retail for a be-

James Siehl, OEMTEK president, is cultivating corporate buyers with a line of modular machines.

hind-the-scenes approach to the marketplace. While Eagle Computer, Columbia Data Products, and a raft of others backed into the OEM and VAR channels, OEMTEK has plunged in headfirst.

"I would think I'd died and gone to heaven if somebody bought our machines and kept our label on," says a modest James Siehl, OEMTEK president and founder. "I just want a little market niche." For all comers, that "niche" was worth $2.3 billion for hardware alone in 1984. Future Computing, the Dallas-based PC market watcher, estimates that by 1987 the OEM segment will more than double to $5.3 billion, a figure that excludes big-name OEMs who sell retail. Jazzing up the basic product with software brought VARs $1.4 billion in 1984, a sum that is estimated to climb to $3 billion within two years.

The way OEMTEK saw it, OEMs and VARs were getting the short end of the deal by settling for hand-me-down hardware designed for retail distribution. In some instances they were forced to assemble their PC compatibles piece by piece, buying a motherboard from one manufacturer (say, Faraday Electronics) and firmware and DOS utilities from another (say, Phoenix Software Associates). What was needed was a one-stop shop that would allow OEMs and VARs to fashion machines in a variety of guises, the better to meet the demands of a shifting marketplace.

OEMTEK maintains a virtual catalog of PC compatibles and stocks it with components manufactured primarily at its joint-venture facility in Taiwan.

IBM's best efforts are now going into Macintosh.

Macintosh and IBM PC software. Compatible at last, thanks to MacCharlie, a rather innovative coprocessing system.

And imagine the consequences.

Nearly 10,000 IBM PC software programs designed for general business and specific applications in real estate, insurance, law, medicine, banking, etcetera, can now join forces with Macintosh's own popular programs.

And, the myriad of IBM PC-compatible software adopts Macintosh's many beloved features, including desktop utilities such as the clipboard and the calculator.

In addition, MacCharlie allows IBM PC and Macintosh data files to be exchanged. Talk about flexibility.

But the good news gets better.

You see, MacCharlie delivers hardware compatibility, as well. For example, IBM letter-quality printers can be easily used with Macintosh.

Furthermore, MacCharlie now allows Macintosh to perform virtually any networking an IBM PC can perform. Even to the extent of tying in with IBM mainframes.

In other words, your networking capability goes beyond the Apple family.

The Macintosh keyboard slides right into MacCharlie's keyboard. About as easy as slipping a letter in an envelope.

Macintosh sets snugly beside MacCharlie, on a custom-fit pedestal.

Once you plug in MacCharlie's power and keyboard cords, you're ready to enjoy a very happy marriage.

How does it happen? As easily as slipping on penny loafers.

In mere moments, MacCharlie combines the best features of the world's premier personal computers.

And despite the fact that it turns one computer into two, MacCharlie adds but a handful of square inches to Macintosh's physique.

In short, one of life's most perplexing decisions—whether to buy a Macintosh or an IBM PC—can now be made with the greatest of ease.

Ask for MacCharlie at your local computer store. Or, for more information, call Operator 12 toll-free, 1-800-531-0600. (In Utah, call 801-531-0600).

MacCharlie offers 256K RAM, with optional upgrade to 640K RAM; 360KB disk drive, and optional second disk drive.

MacCharlie™

THE BEST OF BOTH WORLDS.

MacCharlie is a product of Dayna Communications,
50 S. Main, Salt Lake City, Utah 84144

Apple is a trademark of Apple Computer, Inc. Macintosh is a trademark licensed to Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corporation.

Circle 973 on reader service card

A Corona by any other name would sell as well–at least that's the hope shared by Docutel/Olivetti, N. V. Philips, and Wordplex, whose logos adorn the Corona Data Systems PC.

company aims to please–theoretically, if you're in the mood for a purple console with a green keyboard, OEMTEK will deliver. System units vary in size, height, RAM, processor (8088, 8086, or 80286), and disk drive configuration. PC compatibility reportedly does not vary; OEMTEK tapped Award Software of Los Gatos, California, for its DOS update and BIOS ROM routines.

OEMTEK's ideal customer is the VAR or software systems house that targets vertical markets–particularly medical and legal professionals–and brings in anywhere from $2 million to $20 million on the sale of 200 to 1500 units annually. Of course, the company isn't turning away corporate accounts, either. OEMTEK's mix-and-match approach to PC compatibility gives buyers a choice of three monitors and three kinds of keyboards. The

OEMTEK is perhaps the first IBM-clone maker to tie its fortunes to the OEM market on such a grand scale, but a score of formerly retail-hungry compatibles companies are finding the OEM and VAR markets much to their liking. Among those availing themselves of this "second chance" are ITT, TeleVideo, DEC, GRiD, Texas Instruments–and even, to a degree, Compaq.

ITT. Owing to the Xtra's lethargic retail performance, ITT has signed up with a dozen or so VARs and system integrators, many of whom are outfitting the machine for communications-related vertical markets.

TeleVideo. Company officials are smiling at a three-year OEM contract worth an estimated $35 million from Peking Computer Factory, a China-based supplier to universities and government offices. The pact should help ease the sting of an $8 million fourth-quarter loss.

DEC. Digital Equipment is still Number 2 in computers, but its Rainbow 100 never came close to a pot of gold in the retail world. DEC is now sticking to VARs and its own installed base of minicomputer users and reportedly intends to launch a genuine PC work-alike before year's end.

GRiD Systems. GRiD, looking to "complement" its retail effort and direct sales to Fortune 1000 companies and the Feds, has decided to pitch its pricey new 25-line Compass portable to VARs and OEMs.

Compaq. Compaq's success is rooted in being simpatico with its authorized dealers. Yet even for this bastion of the retail marketplace, other avenues are beckoning. Compaq has inserted a big toe into the VAR waters; Softbridge Microsystems is now bundling its financial planning package with the Deskpro Model 4 (procured via ComputerLand of Boston), then reselling the systems.

The rest. Like TeleVideo, Eagle Computer is living off OEM deals with China, but here OEM could just as well stand for Outstanding Emergency Measures, as in "key to survival." Columbia is providing machines to Honeywell and Control Data, the better to stave off extinction. Bruised by the TI

Professional's poor retail showing, Texas Instruments is marketing its Pro-Lite laptop exclusively to VARs–for now.

The OEM market isn't without its pitfalls and potholes. Leading Edge, which has been on the receiving end of Mitsubishi hardware, recently also found itself on the receiving end of a Byzantine legal hassle with its Japanese supplier. Following a temporary halt in shipments of Mitsubishi machines, Leading Edge filed a $1 billion breach of contract suit; Mitsubishi countersued, seeking payment of bills. The drama vividly illustrates the perils of relying on just one source of supply. It may have been the supply pinch that led Leading Edge to announce it would market the AT&T PC 6300 under its own label–a claim AT&T swiftly squelched.

"It's a convoluted web we're weaving," says Howard Haller, director of OEM sales worldwide for Corona, perhaps the preferred choice among corporate OEMs. In addition to Sperry, Corona's roster of clients includes Docutel/Olivetti, Wordplex, and N. V. Philips. "Convoluted" surely is the word: witness the deal with Docutel/Olivetti–the U.S. marketing arm for Ing. C. Olivetti of Italy–which sticks its name on the desktop and portable computers it buys from Corona and then retails. (The parent firm, of course, has a company called AT&T labeling and marketing its 8086-based PC compatible.) Product "ownership" is murky at best; Corona has delegated most of the manufacturing responsibilities for its desktop and portable lines to Dae Woo Electronics, a South Korean conglomerate. Importing hardware recently enabled the company to pare its domestic assembly line staff by 18 percent.

Corona appears to have successfully weathered the switch from retail to OEM. According to Haller, Corona derived half of its 1984 sales of $120 million from the OEM market; 75 percent of the other half accrued from sales to VARs.

But OEMTEK claims to have an edge on companies like Corona because of its aggressive stance toward the OEM/VAR market. "We're seeing a lot of people in retail trying to shift to OEM," says Dan Seale, the company's marketing and sales chief. "But you can't serve two masters."

Erna Arnesen, VAR market analyst for Future Computing, was initially bowled over by OEMTEK when she saw the company's products and met its management. "I thought they were revolutionary," she says, but reports walking away wondering if the fledgling firm can realize its dream. "I'm not totally convinced they can carve out the niche they want," Arnesen says. "If they can snare big contracts, then maybe they can get the volume they need." The problem, she suggests, is that the smaller VARs in OEMTEK's sights might well align themselves with an NCR or an ITT in order to attract customers.

For now, Seale is mum on the names of the corporate heavyweights that he says are extremely interested in OEMTEK's product

NEW! for IBM® PC, XT, Compaq,® Corona®

FlipKit™

remembers the function keys...

...of all your favorite software. You select your own combination from 20 preprinted function key overlays, and attach your FlipKit to your keyboard –that's all there is to it! Of course, FlipKit is non-glare, easily removable, and will not mark your keyboard. Every FlipKit includes overlays for:

Lotus™ 1-2-3™
Multiplan™
Framework™
Symphony™
dBase® III
IBM® Filing/ Reporting Assistant
Thinktank™
Multimate™
IBM® Writing Assistant
Pfs®:write
Microsoft® Word
Wordstar® 2000
Crosstalk XVI™
MS™ DOS

PLUS
5 "do-it-yourself" erasable overlays and keyboard attachments

Only $14.95! Order Now!

Visa, Mastercard only, call 24 hrs/7 days:
1-800-228-2028 ext. 120 toll free Cont. U.S.
In Nebraska, call 1-800-642-8300 ext. 120
Information, inquiries, call 415-325-8000

Or send check, m.o., credit card info. (#, exp. date, and signature) to:

Micro Direct International
P.O. Box 60987, Palo Alto, CA 94306

Include quantity, name, address, city, state, zip, phone. Sorry no CODs. Order several–shipping/handling per order: USA $3.50/Canada $6/Other countries $15. CA residents add 6-1/2% sales tax. Allow 3-4 weeks delivery (personal checks add 2 weeks). Dealer and corporate inquiries welcome.

FlipKit — Micro Direct International/Lotus 1-2-3, Symphony — Lotus Development Corp./MultiPlan, MS Word, MS DOS — MicroSoft Corp./pfs. write — Software Publishing Corp./Framework, dBase III — Ashton Tate/IBM Writing Assistant, Filing Assistant, Reporting Assistant — International Business Machines Corp./MultiMate — MultiMate International Corp./WordStar 2000 — MicroPro International Corp./Crosstalk XVI — Microstuf, Inc./Thinktank — Living Videotext, Inc.

Circle 223 on reader service card

Give us your staine
your filthy dirty,

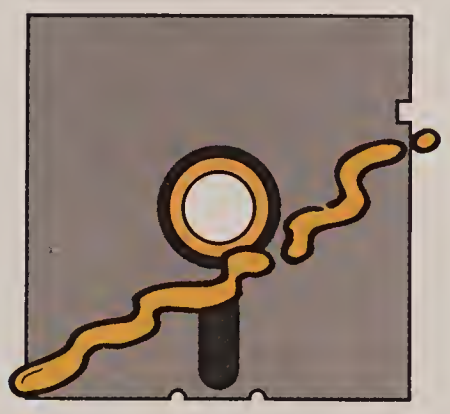
Aunt Molly's jam

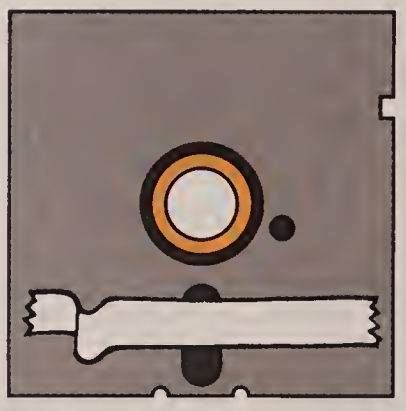
Regular coffee, two lumps

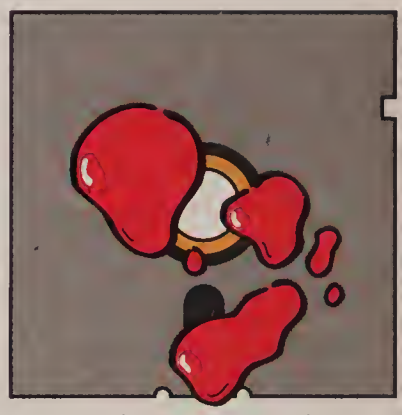
Clouds of smoke

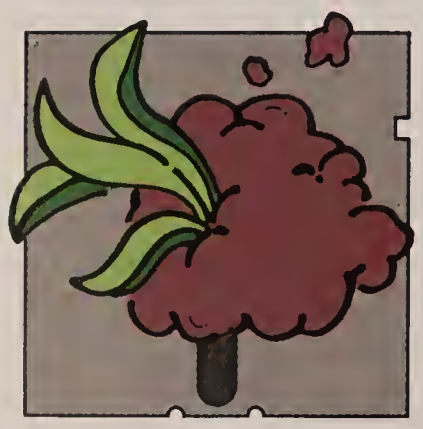
Maria's liquid cover

The big chill

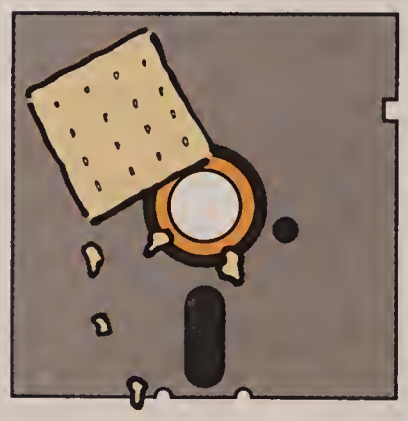

Hot dog mustard


Tacky white tape

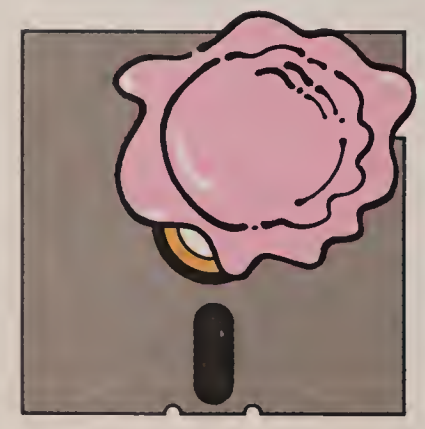

Lunchcounter ketchup


Potted plant–no pot

Fizzy orange soda


Cracker crumbs

Dust (cough-cough)


One scoop of ice cream

Sudsy soap bubbles

Chocolate fingerprints

d, your dog-eared, your mistreated:

Dry martini, one olive

Boss's cigar ashes

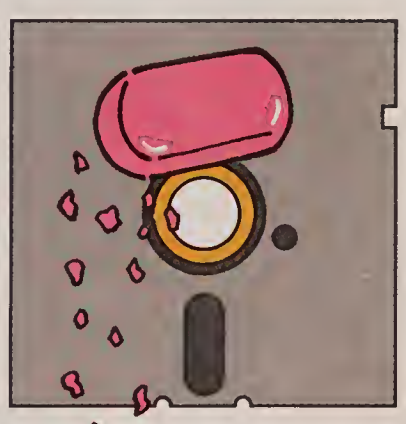
Spilled milk

Dog-eared jacket

Sunny side up

Waterbased ink spots

English breakfast tea


Eraser bits

If it's a Polaroid diskette, we'll fix it.

Accidents can be fatal to floppy disks. But now Polaroid introduces a free data recovery service.

So, if you spill coffee on a Polaroid Professional Quality Diskette, we can help recover your data. (And most other accidents, too.) Call 800-241-4403 and we will tell you how our service works.

These Polaroid floppy disks boast a 20-year guarantee and are certified 100% error-free. And only Polaroid offers a free data recovery service. Because accidents happen.

Polaroid PerfectData

THE PROFESSIONAL QUALITY DISKETTE IN THE GRAY BOX.

Circle 164 on reader service card

olaroid"® of Polaroid Corp.
erfect Data"™ of Perfect Data Corp.

©1985 Polaroid Corp.

SOFTWARE ADVISOR'S
relasoft
CALL TOLL FREE 1-800 IBM ONLY

We Now Ship
FEDERAL EXPRESS

AMERICAN EXPRESS MasterCard VISA

• No Charge for VISA and Mastercard

• Order Line: 1-800-426-6659
• Order Processing & Other Information: 602-224-9345
• Order Line Hours: Mon.-Fri 8:30 - 5:30 Saturday 9:00 - 1:00
Address: 1943 East Indian School Road # 194 Phoenix, Arizona 85016

• Shipping and Handling Add $7.00 for **Federal Express** standard air or $5.00 for UPS Ground to Total Order
• Personal and Company Checks Will Delay Shipping 2 weeks
• COD Orders Add 2% – $250.00 Minimum
• Call on Purchase Orders
• Prices & Availability Subject to Change Without Notice
• We Do Not Guarantee Machine Compatibility

Framework ..... Call
dBase III ..... Call
Word Perfect (Ver. 4.0) .. $225

Symphony $409
Lotus 1-2-3 ..... $289
Supercalc 3 (Ver. 2) $165

WORD PROCESSORS
Bank Street Writer ..... $ 48
Leading Edge Word Processor 59
Microsoft Spell (For Microsoft Word) 30
Microsoft Word 2.0 ..... Call
PFS: Proof 55
PFS: Write 79
Volkswriter Deluxe 149
Word Plus Spell Checker 89
Wordstar w/Tutor 169
Wordstar Pro Pack 240
Wordstar Pro Option 109

UTILITIES
Copy II PC ..... $ 23
Desk Organizer 115
Norton Utilities 3.0 58
Prokey 3.0 75
Sidekick 30
Sidekick(Unprotected) 48
Sideways 35
Spotlight 88

LANGUAGES
Basic Interpreter (Microsoft) $209
Basic Compiler (Microsoft) 239
Borlanda Holiday Pack 59
C Compiler (Microsoft) 299
Cobol Compiler (Microsoft) 419
Concurrent PC DOS 179
Fortran Compiler (Microsoft) 209
Lattice C Compiler 285
Lattice Run C Interpreter 89
Macro Assembler ..... Call
Pascal Compiler (Microsoft) 179
Turbo Pascal 30
Turbo Tool Box 30

TRAINING
Flight Simulator ..... $ 32
Jim Fix Running Program 48
Mastertype 26
Mind Prober 32
Speed Reader II 45
Turbo Tutor 20
Typing Instructor 30
Typing Tutor III 30

MONEY MANAGEMENT
Dollars & Sense w/Forcast ..... $ 99
Home Accountant Plus 82
HowardSoft Tax Preparer ..... Call
JK Lasser Tax Preparer 49
Managing Your Money 105
Tax Advantage 39

COMMUNICATIONS
CompuServe Starter Kit ..... $ 23
Crosstalk XVI 98
PFS: Access 55

SPREADSHEETS
Multiplan $115
PFS: Plan 79
Spreadsheet Auditor 59

DATA BASE MANAGEMENT
Advanced DB Master $289
dBase II ..... Call
dBase Manager II 165
Knowledgeman 255
K-Graph 135
K-Paint 60
K-Text 105
Nutshell 60
PFS: File 79
PFS: Report 71
Powerbase 199
Quickcode II/III 145
QuickReport II/III 145
R: Base 4000 245
Clout 2 130
Extended Report Writer 80
Think Tank 99

PROJECT MANAGEMENT
Harvard Project Manager $209
Harvard Total Project Manager 259
Microsoft Project 150

INTEGRATIVE SOFTWARE
Electric Desk $189

GRAPHICS
Chartmaster $235
DR Draw 179
Dr. Halo 59
Energraphica 199
Energraphics w/ Plotter Option 259
Microsoft Chart 150
PC Draw 239
PC Mouse w/Paint 129
PC Paint 65
PC Paintbrush 79
PFS: Graph 79
Signmaster 165

Multimate (Ver. 3.3) $259
In-House Acountant $105
Cornerstone 285

Wordstar 2000 ..... $239
Wordstar 2000 Plus $289
Smart Software Systems $499

Circle 921 on reader service card

line but haven't yet signed contracts. The company is hoping that 1985 will be the year that propels the firm toward its revenue goal of $100 million by 1987. If so, look for OEMTEK to be laughing all the way to the bank—anonymously, of course. – *Jane Ferguson*

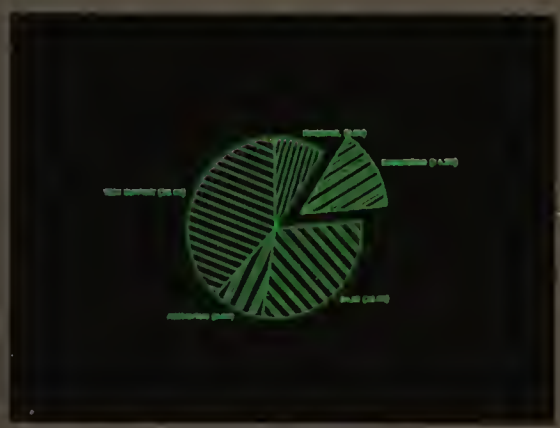
Jane Ferguson is the former editor of the San Francisco Business Journal.

Tandy Gets Into the ACT

The previous discussion notwithstanding, there's nothing wrong with retail, particularly if you're good at it. Texas's Tandy Corporation and England's Applied Computer Techniques (ACT), two titans of direct sales, have joined forces in a new European venture known as AT ComputerWorld. The alliance instantly created the largest computer retailing operation on the Continent—one devised to keep Olivetti and IBM at bay. The endeavor also represents a breakthrough of sorts for Tandy, whose 430 European Tandy Computer Centers will now admit hardware wearing something other than the Tandy, Realistic, or Radio Shack label. ACT's MS-DOS-based Apricot line is dominant in the U.K. but hasn't fared as well across the Channel.

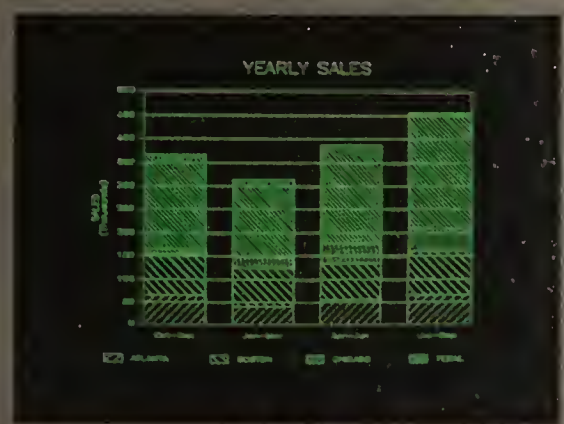
And you thought there was only one "Graphics Card."

AST introduces Preview!™ for $100 Less.



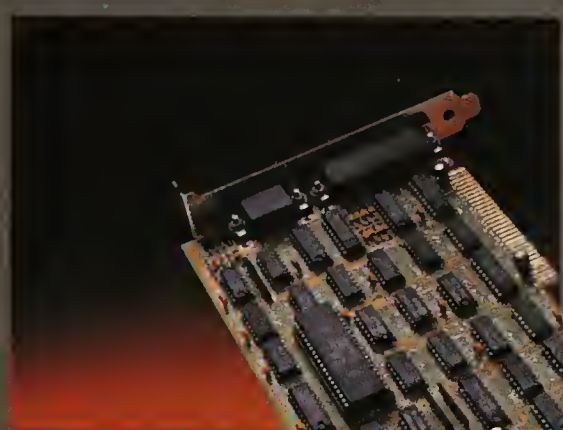
SYMPHONY ™

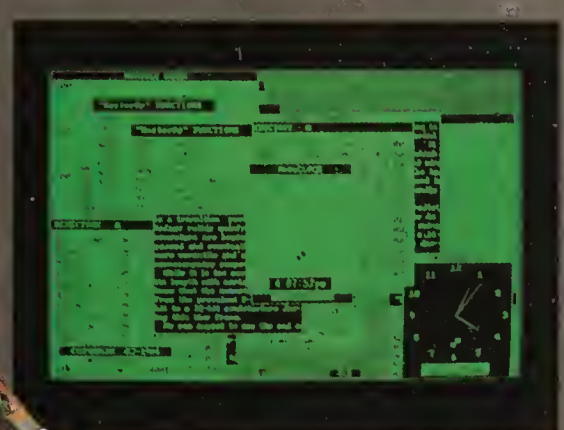
WORD ™



1-2-3 ™

FRAMEWORK ™





MetaWINDOW ™

Now you have a choice for bit-mapped graphics. Priced at $399—$100 less than what you'd expect—AST's Preview! brings high resolution bit-mapped graphics and clear, crisp text to your IBM® PC, XT or AT monochrome screen. And there's no standard like AST quality.

Preview! provides all the features and functions you'd expect, like bit-map addressing the maximum supported 720 horizontal pixels by 348 vertical lines for two pages of full-screen high resolution graphics, an IBM PC-compatible parallel printer port and Hercules™ bit-mapped graphics card compatibility.

It works with all kinds of software too, no other card offers more. New generation integrated business programs, bit-mapped text processing and advanced windowing applications are specialties.

Then there's the nonstandard features AST is famous for—consistent quality, reliability, comprehensive documentation, service, support and extra value. We include our SuperPak™ RAM disk simulator and printer spooler utility diskette. Judged by PC WORLD readers as a World Class Winner for the past two years, it's worth $45 by itself.

The leadership strength that makes our consistent quality so affordable is carried throughout our complete line of PC enhancement products. We offer a family of graphics products which provide a variety of features from serial ports to expansion memory, as well as multifunction boards, micro-to-mainframe communications, local area networks and disk subsystems.

So you can settle for the common, ordinary graphics card and hope for the best. Or you can pay $100 less and know you have the best—Preview! only from AST. For more information and dealer locations call our Customer Information Center (714) 863-1333, Ext. 5249. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 TWX: 753699AST UR.

Circle 18 on reader service card

FEATURES

- *64K Screen Memory*
- *Two Pages of High Resolution 720 Horizontal PELS by 348 Vertical Line Bit-Mapped Monochrome Graphics*
- *80 Character By 25 Line IBM PC-Compatible Text Display*
- *Standard IBM Character Set*
- *Compatible With Popular Bit-Mapped Graphics, Text and Windowing Applications Software*
- *Parallel Printer Port*
- *SuperPak Utility Diskette*
- *Hercules Compatible*

Preview! and SuperPak trademarks of AST Research, Inc. IBM trademark of International Business Machines Corp. Hercules Graphics Card trademark of Hercules Computer Technology. Lotus 1-2-3 and Symphony trademarks of Lotus Development Corp. Framework trademark of Ashton-Tate. Word trademark of Microsoft, Inc. MetaWINDOW trademark of Metagraphics.

AST RESEARCH INC.

Tandy itself wasn't faring terribly well as 1984 drew to a close; total sales were off and net income took a 25 percent dive. The silver lining is a new machine enjoying a dazzling debut. The price-busting, PC-compatible Tandy 1000 shattered the first month sales record for a Tandy computer. A single-drive 128K Tandy 1000 lists for $1199 out the door.

In Review

Kiss of Approval

In the story of the frog-prince, a handsome prince becomes trapped in a frog's body and can be released only by the kiss of a beautiful princess. In computing, DOS is king; CP/M users spend long hours gazing at their once-handsome machines wondering if there's a prince locked inside.

The SWP Co-Power-88 System is the kiss that has the power to transform CP/M computers (in my case, a Kaypro II) into the somewhat regal "industry standard."

Put a bit more prosaically, the SWP Co-Power-88 System is an expansion board for CP/M machines that brings with it a degree of MS-DOS compatibility. The advantage of an add-on DOS board is that it allows CP/M users to keep their present systems and protect their often substantial investments in programs and data. The Co-Power-88 board can also be used as a RAM disk, increasing both CP/M memory and processing speed.

On board are an 8088 CPU that runs at 5.33 MHz (20 percent faster than the PC) and 128K or 256K of RAM. System software includes DOS 2.11, a set of DOS utilities, and RAMDISK.COM–the CP/M program that lets you use the board as an additional disk drive while you're operating under CP/M. The system is available for Kaypros (including a special version for the Kaypro 10), the Zorba, the Xerox 820 and 820-II, the Bigboard and Bigboard II, the Osborne I, and the SWP ATR8000. Kaypro thinks enough of the board to include it as a factory-installed option for some models.

When you install the Co-Power-88 System, follow your best instinct–be cautious. Installation is neither difficult nor time-consuming (45 minutes should do it), and the documentation is commendably clear. Still, pulling chips, especially the Z80, can be tricky business.

Unless you're familiar with this kind of work, get a book on computer maintenance: you'll want to know how to ground yourself, how to pull chips from their sockets, and what tools you'll need. SWP would do well to provide such information with the board; a pair of chip-pulling tweezers wouldn't hurt, either. But your watchword should be caution, not fear. Even if you've never taken the cover off the box, you can do the job.

To install the system, it's necessary to remove the Z80 CPU chip, then plug the Z80 into an SWP adapter board that goes back into the Z80's socket. The main processor board, which contains the 8088 and the memory chips, fits inside your machine. In the Kaypro, it sits just behind the disk drives. A flat ribbon cable connects the main board to the adapter board. The Co-Power-88 System is driven by the host computer's power supply.

Once system hardware is installed, loading system software is a snap. SWP's version of DOS 2.11 comes on two disks: the first is a CP/M formatted disk that contains the required DOS load programs and the RAMDISK.COM disk emulation program. The second disk contains COMMAND.COM and a set of DOS utilities. To load DOS, you boot up with CP/M and then run MSDOS.COM, which sets up the operating system switch. You then load MS-DOS. The system prompts you when it's ready to accept a DOS disk, and that completes the system load.

Unlike beauty, PC compatibility isn't in the eye of the beholder; a package either runs or it doesn't. The SWP system allows you to format data disks that are fully PC-DOS compatible, but so do many format conversion programs that cost substantially less. A number of MS-DOS programs–and some PC-DOS programs–will run, but only if they're not hardware dependent. DOS-based communications programs, for exam-

NEC Peripherals.
We make everybody look good.

NEC®

NEC Home Electronics (U.S.A) Inc.

Wherever there's a computer, there's a need for NEC monitors and printers.

Whether you own a business computer, or simply own your own personal computer, owning an NEC monitor and printer makes all the difference in the world.

With a full line of high quality, reliable monitors and printers to choose from, you're sure to find just the right companion for your computer. And they're friendly with just about any computer you can think of. From our very own NEC personal computers to IBM, Apple, TI, Commodore, Franklin and Atari - PCs, NEC has monitors and printers to make their output look even better.

NEC's complete line of 12-, 13- and 14-inch monitors include RGB, monochrome, color composite and switchable models. Refer to the compatibility chart below for the model that fits your needs.

See your nearest NEC dealer for a demonstration today.

The **JB-1201MA,** with its classic NEC 12" screen, is our renowned best-seller. It's popularity stems from its 1.0 watts of audio output power, and compatibility and versatility for almost any computer application.

$179.00

Resolution
Horizontal
800 lines (at center)
Vertical
230 lines

Video Bandwidth
18mHz (±3dB)

Display Character Area
80 characters with 25 lines — 8 x 8 dots

Audio Output Power
1.0 watts

NEC MONITOR COMPATIBILITY CHART

COMPUTER	JB-1270MA	JB-1275MA	JB-1280DA/ JB-1285DA	CT-1305A	JB-1201MA	JB-1205MA	JB-1260MA	JC-1216A	JC-1460DA	JC-1410P2A	JC-1215A
IBM PC, PCAT & COMPATIBLES	SB/RCA	SB/RCA	CI	SB/CG91	SB/RCA	SB/RCA	SB/RCA	SB/CG91	SB/CG91	SB/CG91	SB/RCA
IBM PC Jr.	RCA	RCA	—	CG91	RCA	RCA	RCA	CG91	CG91	—	RCA
APPLE IIE	RCA	RCA	—	SB/CG91	RCA	RCA	RCA	SB/CG91	SB/CG91	—	RCA
APPLE III	RCA	RCA	—	SC	RCA	RCA	RCA	SC	SC	—	—
APPLE IIC	RCA	RCA	—	SI	RCA	RCA	RCA	SI	SI	—	RCA
VIC 20	CG20/64	CG20/64	—	—	CG20/64	CG20/64	CG20/64	—	—	—	CG20/64
COMMODORE 64	CG20/64	CG20/64	—	—	CG20/64	CG20/64	CG20/64	—	—	—	CG20/64
ATARI 600	CG20/64	CG20/64	—	—	CG20/64	CG20/64	CG20/64	—	—	—	CG20/64
ATARI 800/1200	CG20/64	CG20/64	—	—	CG20/64	CG20/64	CG20/64	—	—	—	CG20/64
COLECO ADAM	—	—	—	—	—	—	—	—	—	—	CGCA
TI 99/4	RCA	RCA	—	—	RCA	RCA	RCA	—	—	—	RCA
FRANKLIN ACE	RCA	RCA	—	—	RCA	RCA	RCA	SB/CG91	SB/CG91	—	RCA
NEC PC-8801A	CI	CI	—	CG92	CI	CI	CI	CG92	CG92	CG92	—
NEC PC-8201A	••	••	—	••	••	••	••	—	—	—	••
STARLET (PC-8401A)	•	•	—	•/CG92	•	•	•	•/CG92	•/CG92	—	—

RCA NEED RCA TO RCA CABLE SOLD AT ANY ELECTRONIC STORE
SB NEED SPECIAL BOARD SOLD BY ANOTHER VENDOR
CG91 NEED NEC CG-91 CABLE
SC NEED SPECIAL CABLE SOLD BY ANOTHER VENDOR
CI CABLE INCLUDED
CG20/64 NEED NEC CG-20/64-5P CABLE
CG92 NEED NEC CG-92 CABLE
SI NEED SPECIAL INTERFACE SOLD BY ANOTHER VENDOR
CGCA NEED NEC CGCA/JC-1215 CABLE
• NEED NEC PC-8441A CRT/DISK ADAPTOR
•• NEED NEC PC-8241A CRT INTERFACE

NEC's full line of quality printers includes the impressive PC-PR103A Letter-Perfect and PC-8027A Transportable printers.

Using an innovative Impact Line-Dot type Printhead, the **PC-PR103A** gives you printouts that are practically indistinguishable from letter-quality printers. It also gives you the advantage of printing three times faster, and provides two additional printing modes—graphics and draft quality. It even eliminates "ghosting" with single-pass printing.

$499.00

Printing Method	Impact Dot Matrix
Print Speed	High Speed Pica 92CPS High Density Pica 46CPS Elite 110 CPS Condensed 78CPS
Buffer Size	4K "Bit Image" type
Paper Feed Method Standard	Friction and Tractor Feed
Interface	Centronics, 8-bit parallel

Weighing only 14 lbs., the **PC-8027A** is the perfect companion for your transportable computer. It has an attached paper bin, and a convenient carrying handle so you can take it anywhere for quick printouts of both text and graphics.

$499.00

Printing Method	Impact Dot Matrix Logic Seeking
Speed	105 CPS
Paper Feed Method Standard	Friction and Pin Feed
Interface	Centronics, 8-bit parallel
Buffer Size	2K

Both the PC-PR103A and the PC-8027A give you all the capabilities you'd normally expect from larger printers. And best of all, they cost less than most of the rest.

For software installation, choose the PC-8023A or any teletype-like printer. These choices will work with some software programs. All features of the printer may not be supported. Please contact the software vendor for additional information.

If you're looking for a midsize color monitor, but are concerned about cost, consider the **JC-1216DFA.** It offers the most in a 12" RGB high-resolution color monitor at an affordable price.

$599.00

Resolution
Horizontal
640 dots
Vertical
240 lines

Video Bandwidth
10mHz

Display Character Area
80 characters with 25 lines — 8 x 8 dots

Make your IBM look better.

Dramatically improve the image of your IBM computer with NEC's new **JB-1280DA.** It's IBM-PC and IBM-PC AT plug-compatible, weighs only 14 lbs., and features a 12" non-glare Phosphor P31 (green) screen. The JB-1280DA — intelligently designed to provide excellent performance, reliable service and high resolution at a very affordable price.

$199.00

Resolution
Horizontal
720 dots
Vertical
350 lines

Video Bandwidth
20mHz

Display Character Area
80 characters with 25 lines — 8 x 8 dots

#1 for me. NEC

NEC®

NEC Home Electronics (U.S.A) Inc.
Personal Computer Division
1401 Estes Avenue
Elk Grove Village, IL 60007
(312) 228-5900

NEC Corporation
Tokyo, Japan

All specifications and prices are subject to change without notice
© 1984 NEC Home Electronics (U.S.A.) Inc

YOUR DAYS OF BUYING TERMINALS ARE OVER!

Now there's SmarTerm terminal emulation software for your IBM* PC, XT, AT or compatible system. All SmarTerm products offer comprehensive and exact terminal emulation, powerful ASCII and binary file transfer facilities, and include TTY mode to link you to The Source, CompuServe, Dow Jones, Easylink, Tymnet or other popular services. We've included features such as multiple setup configurations, XMODEM and PDIP* protocol support, "smart" softkeys, plus European DOS support.

NEW SmarTerm 220 supports A-to-Z and other software requiring DEC* VT220 terminals. It includes the full capabilities of **SmarTerm 100**: DEC VT102, VT100, and VT52 emulation. If you need VT125 ReGIS graphics support, choose **SmarTerm 125**. For Data General Dasher* D100, D200, or D400 emulation you need **SmarTerm 400**.

Don't "scurry" around buying more obsolete terminals. Join the 20,000 users that have chosen SmarTerm. Try it for 30 days, with full refund privileges.

Persoft, Inc. - Madison, WI
(608) 273-6000 - TELEX 759491

AFTER SMARTERM™, WHAT DO YOU DO WITH YOUR OBSOLETE TERMINAL?

IDEA CREDIT: Anne Hillebrand of Ada, Oklahoma. See your name in print! The best ideas for uses of obsolete terminals replaced by SmarTerm will be used in future ads. Write Persoft, Dept. GERBIL., 2740 Ski Lane, Madison, WI 53713.

*SMARTERM and PDIP are trademarks of Persoft, Inc. * IBM is a registered trademark of International Business Machines Corp. * DEC, VT and ReGIS are trademarks of Digital Equipment Corp. * DASHER is a registered trademark of Data General Corp.

persoft

© Persoft Inc. 1985 All rights reserved

Circle 142 on reader service card

ple, don't work with the Co-Power-88 unless they allow port modifications. SWP advises discretion in running programs that use the PC's BASICA, a kernel of which is contained in the PC's ROM. SWP's version of DOS includes a screen handler that can emulate either the PC's text mode or a Lear Siegler terminal.

A more obvious source of incompatibility is media. My Kaypro, for instance, has single-sided drives. The bulk of the DOS programs sitting on store shelves are formatted for double-sided drives.

With the system, SWP includes a list of more than 60 off-the-shelf packages that the company has successfully tested for compatibility. Among those passing with flying colors are the General Ledger module of *TCS Accounting*, Ashton-Tate's *dBASE II*, Fox & Geller's *Quickcode*, Microrim's *R:base 4000*, MicroPro's *WordStar* (PC versions up to but not including 3.3), Microsoft's *Multiplan*, and *T/Maker III* integrated software. The list generally jibes with my test results. I had no trouble running *dBASE II*.

Happily, Lotus diehards need not fear. The Co-Power-88 System for the Kaypro 4/84 and the Kaypro 10 runs version 1A of *1-2-3* for the PC. The system uses a special Lotus utility along with DOS 2.11A to give you bare-bones *1-2-3*—that's sans screen graphics. DOS 2.11A for both Kaypros also improves PC compatibility by redefining the Kaypro's numeric keypad as a complete set of PC function keys.

If you're a CP/M devotee looking for a way to add new power to your existing system, or if you've got a PC at work and a CP/M machine at home that you'd like to keep working on, the SWP Co-Power-88 System just may be the magical kiss you're looking for. Shop carefully, however: the board provides a modest but workable level of PC compatibility. SWP's included list of tested software suggests that the company is concerned that potential users be adequately informed of the product's strengths and limitations.
–Clifford Guren

Clifford Guren is a technical writer for Bank of America and former head of the San Francisco Kaypro User's Group.

Co-Power-88 System
SWP Microcomputer Products, Inc.
1000 W. Fuller
Fort Worth, TX 76115
(817) 924-7759
List price: 128K system $400, 256K system $500

Software

What the Latest Compatibles Are Running . . .

Alpha Software has placed its *Electric Desk* integrated package in IBM Product Centers. Alpha has also released a version of the program for the TI Pro-Lite laptop machine . . . In a similarly mobile vein, Traveling Software has unveiled versions of its *Business Manager Series* for the Pro-Lite, the Osborne Encore/Morrow Pivot, the DG/One, and the Sharp PC-5000. The series consists of appointment manager, project manager, sales manager, expense manager, and time manager modules . . . Corona Data Systems has taken on the Vertical Software Series, Trac Line Software's integrated accounting package that features modules geared to retail and wholesale applications . . . CertiFLEX Systems has tailored its line of accounting software for the Tandy 1000 and Tandy 1200 computers.

Morrow Designs, Wyse Technology, and MAD Computers have licensed *GSS-Drivers*, Graphic Software Systems' implementation of ANSI's virtual device

WHY BUY RESOLUTION YOU CAN'T USE?

TEKNIKA MJ-22

...gets optimum results from your IBM PC or PCjr, yet costs far less than higher resolution monitors!

1 Compare colors. The MJ-22 gives you 16 true colors of unsurpassed brilliance. And unlike many other monitors, all colors are accurate. Brown is brown, yellow is yellow, light red is light red—there are no approximations.

2 Compare readability. The .5mm fine slot pitch of the CRT produces clearer, more legible text, especially in the 80-column mode. And, because of the precise slot convergence, you get a clear, sharp image instead of the usual multi-color fuzziness.

3 Compare the gray scale. You get four shades of gray on the MJ-22—not just two or three that other monitors produce.

4 Compare linearity. There's hardly any distortion on the MJ-22. You get more accurate charts because verticals are vertical, horizontals are horizontal, circles are circles.

5 Compare versatility. The MJ-22 accepts RGB, Composite or Separated Video. This means it can be used with an IBM PC, PCjr or PC XT and produce 16 accurate colors and high resolution graphics.

6 Compare sound. The MJ-22 has a built-in speaker and amplifier right up front for the highest quality sound.

7 Compare screen size. The MJ-22 has a full inch more usable space than other 13″ monitors.

8 Compare cost. Dollar for dollar, the MJ-22 will outperform any other monitor in its price range—and many costing far more.

Why spend more money than necessary for a higher resolution color monitor when your computer cannot take advantage of it? With a screen resolution of 506 x 240 pixels, the Teknika MJ-22 accurately delivers the sharp, brilliant signal your IBM PC or PCjr generates—at a price that's up to $250 less than monitors with more resolution than you can use.

For the PCjr, Teknika's interface cable MA-19 produces 16 beautiful colors, including true brown, 2,000 clearly legible characters (80 characters x 25 lines) and extremely sharp graphics.

For similar results with the IBM PC and XT, use Teknika's MA-21 cable and an IBM Color Graphics Monitor Adaptor.

Visit your nearest computer dealer and ask for a demonstration.

TEKNIKA

A SUBSIDIARY OF THE GENERAL CORP., JAPAN

Teknika Electronics Corp. · 353 Route 46W, Fairfield, NJ 07006 · (201) 575-0380 · Computer Peripheral Dept.

Circle 997 on reader service card

ALL OF THESE...

And many other IBM PC® compatible software programs.

ASCOM™ is a trademark of Dynamic Microprocessor. **Basic/Basica™** is a registered trademark of Microsoft. **Bottom Line Strategist™** is a trademark of Ashton Tate. **BPI™ General Accounting** is a trademark of BPI. **Castle™** is a trademark of Freeware Games. **Certified Accounting System™** is a trademark of Certified Software. **Clout™** is a trademark of Microrim. **Condor 3™** is a registered trademark of Condor Computer. **Crosstalk XVI™** is a trademark of Microstuf. **Data Base Manager II™** is a trademark of Alpha Software. **DataStar™** is a trademark of MicroPro. **DayFlo™** is a trademark of DayFlo, Inc. **dBASE II™** is a registered trademark of Ashton Tate. **dBASE III™** is a trademark of Ashton Tate. **DisplayWrite 2™** is a trademark of IBM. **DOS™** is a registered trademark of Microsoft. **IBM®** **Dow Jones Market Analyser™** is a trademark of Dow Jones. **DR Graph™** is a trademark of Digital Research. **Easy Filer™** is a trademark of I.U.S. **Easy Speller™** is a trademark of I.U.S. **Easy Writer II™** is a trademark of I.U.S. **EDIX™** is a trademark of Emerging Technology. **EnerGraphics™** is a trademark of Enertronics. **Expert Choice™** is a trademark of Decision Support. **Fast Facts™** is a trademark of Innovative Software. **FAST GRAPHS™** is a trademark of Innovative Software. **FCM—1st Class Mail™** is a trademark of Continental Software. **FilePlan™** is a trademark of Chang Labs. **FinalWord™** is a trademark of Mark of the Unicorn. **Financial Planner™** is a trademark of Ashton Tate. **Forte™ 3270 Emulation** is a trademark of Forte Data System. **Friday!™** is a trademark of Ashton Tate. **Harvard Project Manager™** is a trademark of Harvard Software. **Home Accountant Plus™** is a trademark of Continental Software. **IBM® 3101 Emulation** is a registered trademark of IBM. **Informix™** is a trademark of Relational Database. **InfoScope™** is a trademark of Userview Corporation. **InfoStar™** is a trademark of MicroPro. **InSearch™** is a trademark of Menlo Corporation. **InteCalc™** is a trademark of Schuchardt Systems. **IntePert™** is a trademark of Schuchardt Systems. **IntePlan™** is a trademark of Schuchardt Systems. **Knoware™** is a trademark of Knoware. **KnowledgeMan™** is a trademark of Micro Data Base System. **Lotus 1-2-3™** is a trademark of Lotus Development. **MAG/base™** is a trademark of MAG Software. **Mailing List™** is a registered trademark of Alpha Software. **Management Edge, The™** is a trademark of Human Edge. **Metafile™** is a trademark of Sensor Based Systems. **Microsoft® Project** is a registered trademark of Microsoft. **Money Decisions™** is a trademark of Eagle Software Pub. **MultiMate™** is a trademark of MultiMate International. **Multiplan™** is a trademark of Microsoft. **Norton Utilities™** is a trademark of Peter Norton. **PC Write™** is a trademark of Quicksoft. **PeachText 5000™** is a trademark of Peachtree Software. **Peachtree™ Accounting** is a trademark of Peachtree Software. **Perfect Calc™** is a trademark of Perfect Software. **Perfect Writer™** is a trademark of Perfect Software, Inc. **Personal Pearl™** is a trademark of Pearlsoft. **pfs':access** is a registered trademark of Software Publishing. **pfs': file** is a registered trademark of Software Publishing. **pfs': graph** is a registered trademark of Software Publishing. **pfs': proof** is a registered trademark of Software Publishing. **pfs': report** is a registered trademark of Software Publishing. **pfs': write** is a registered trademark of Software Publishing. **Please™** is a trademark of Hayes Micro Products. **Portfolio Decisions™** is a trademark of Eagle Software Pub. **Power-base™** is a trademark of Power Base Systems. **Probase™** is a trademark of Probase Group. **R:Base 4000™** is a trademark of Microrim. **Real World™ General Ledger** is a trademark of Real World Corp. **ReportStar™** is a trademark of MicroPro. **Rogue™** is a trademark of Artificial Intel. **Sales Edge, The™** is a trademark of Human Edge. **Shoebox™** is a trademark of Techland Systems. **Spellbinder™** is a trademark of Lexisoft. **SuperCalc 2™** is a trademark of Sorcim. **SuperCalc 3™** is a trademark of Sorcim. **SuperWriter™** is a trademark of Sorcim. **T/Maker III™** is a trademark of T/Maker Co. **Tax Cut Planner™** is a trademark of United Micro Systems. **Tax Decisions™** is a trademark of Eagle Software Pub. **Tax Preparer™** is a trademark of HowardSoft. **Think Tank™** is a trademark of Living Videotext. **TIM III™** is a registered trademark of Innovative Software. **TK! Solver™** is a trademark of Software Arts. **Typing Tutor™** is a trademark of IBM (Microsoft). **VCN/Execuvision™** is a trademark of Prentice Hall Inc. **VersaForm™** is a trademark of Applied Software Tech.

ARE BETTER WITH THIS.

Meet DESQ, The Multi-Window Software Integrator. That's Software Integrator not Integrated Software Package. The difference between them makes all the difference in the world because an Integrator allows you to keep using all the applications you know and love instead of limiting you to a single manufacturer's programs.

Now you can go ahead and integrate all your software without any of your current applications becoming obsolete. Including the custom programs you've already invested substantial time and money in.

In fact, DESQ will make your stand-alone applications work as a more powerful, more effective whole. It actually adds capabilities to your programs.

That's because DESQ has an incredible number of special features. First, of course, are WINDOWS, multiple spaces created by DESQ on your screen that show you several different programs. Not only does DESQ let you use up to 9 programs at once, it lets you decide how you see them.

DESQ also has MARK AND TRANSFER, the ability to transfer data between programs and position the information exactly; and NOTEPAD, the feature that lets you take notes and save ideas while you're working on another program. Then there's LEARN, DESQ's ability to remember keystrokes and commands. FILE AND PRINT is another terrific feature that lets you get at DOS while working on something else.

Best of all, DESQ is open-ended. It has the intelligence and flexibility to grow with you and your workload. You can add any number of applications or custom programs as long as they'll run on an IBM PC® or compatibles. You'll need 256K for DESQ plus memory for your largest program and a Winchester Disk running DOS 2.0, minimum. If you want to know where to get DESQ just call 800 845-6621 (outside California) for the nearest DESQ dealer.

With DESQ, you and your software are going to be a lot better together.

DESQ™

The possibilities are endless.

Quarterdeck Office Systems

1918 Main Street, Santa Monica, California 90405 • Telephone: 213-392-9851

Circle 583 on reader service card

From **COMPUTER PLUS** to YOU . . .

Tandy 1000 $999
1 Drive 128K

Tandy 1200 $2195
10 Meg. 256K

BIG SAVINGS on TANDY Compatibles

PRINTERS

Okidata 92	389
Okidata 93	619
Star SG-10	245
Star SG-15	410
Star SD-10	365
Panasonic P-1091	295
Toshiba 1340	615
Silver Reed EXP-770	749
Silver Reed EXP-550	425
Epson RX, FX, JX, LX, LQ	CALL

MONITORS

Taxan 440 RGB Ultra HI-RES	559
Taxan 425 RGB Color/Green	449
Taxan 121 TTL Green	139
Taxan 122 TTL Amber	149

P.C. PERIPHERALS

Bernoulli Box 20 Megabyte	2495
Corvus OmniNet 5.5 Meg.	1295
Quadram Exp. Quadboard 64K	249
STB Graphics Plus II	289
Persyst BOB Board HI-RES	479
Persyst Monochrome Board	179
Quadram PC Jr. Exp. Chassis	499
Hayes 300 Baud Modem	215
Hayes 1200 Baud Modem	429

computer plus
SINCE 1973

P.O Box 1094
480 King Street
Littleton, MA 01460

CALL TOLL FREE
1-800-343-8124

IN MA CALL (617) 486-3193

Circle 210 on reader service card

BACKUP PROTECTED SOFTWARE WITH COPY II PC™

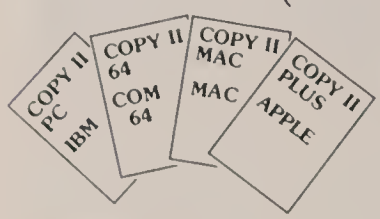
The backup insurance you need to protect your software investment, **COPY II PC** makes a floppy backup of most* protected software quickly and easily.

RUN PROTECTED SOFTWARE FROM YOUR HARD DISK

COPY II PC makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software - *call for current list.*

Minimum Requirements: IBM PC, XT, AT, 256K jr and some compatibles.
One or two disk drives. 64K on most machines.

Call M-F 8-5:30 (W. Coast time) with your VISA : **503/244-5782.**
Or send a check (add $3 s/h, $8 overseas) to



CENTRAL POINT Software, Inc.
9700 SW Capitol Hwy. #100
Portland, OR 97219

$39.95

* We update Copy II PC regularly to handle new protections; you as a registered owner may update at any time for 1/2 price!

This product is provided for the purpose of enabling you to make archival copies only.

Circle 31 on reader service card

interface (VDI) . . . Digital Research's Mac-like Graphics Environment Manager (GEM) is ready for ACT's Apricot line of MS-DOS machines . . . 3Com is now supplying *EtherSeries* local area network products for the Ericcson PC, a highly compatible machine from Sweden. *EtherSeries* includes network boards, servers, and operating system software . . . Norton-Lambert's *Lync* communications package has been modified to run on the DG/One (equipped with an internal modem) . . . Seequa Computer has reduced some system prices by "unbundling" software. The firm has also introduced the Chameleon RAM PLUS expansion board, which includes 128K, 256K, or 384K of RAM.

Compatibles Update *welcomes contributions from readers, and we'll pay up to $50 for the items we use. Please include your name, address, and phone number with your contribution. Send them to* Compatibles Update, PC World, *555 De Haro St., San Francisco, CA 94107.*

Companies in Search of Excellence

Use ProKey™ to make their software more efficient.

Sometimes, the simplest ideas are also the best formulas for success.

Like a $130 software enhancer called ProKey.

With ProKey, you can define any key as an abbreviation for thousands of characters or command sequences.

And repeat them with one keystroke!

Use ProKey to log onto a mainframe in moments.

Update a spreadsheet and print a graph when you touch a single key.

Or make sophisticated programs like dBase II far easier to operate.

In fact, ProKey can integrate all your software into a complete turnkey system that automatically loads and operates programs.

And by reducing complex commands to simple keystrokes, ProKey dramatically simplifies training and documentation!

ProKey's an excellent idea that's available at computer stores everywhere.

To find out more, send for our free 16 page booklet, "The Power of ProKey."

RoseSoft™
4710 University Way N.E.
Seattle, WA 98105
(206) 524-2350

To run ProKey, you'll need an IBM PC, XT or jr., or a compatible, and DOS (any version including 2.1.) dBase II is a trademark of Ashton-Tate. Corporate and OEM licenses available.

Circle 162 on reader service card

ON APRIL 17, TEN EYEWITNESSES SAW
THIS SAMNA DISKETTE MURDER A WANG.

SAMNA Office Automation Software for PC's* outperforms dedicated word processors.

We asked a group of Office Automation professionals to compare SAMNA Office Automation software to the dedicated word processors they've used the most.

The results were shocking. All 10 of the Office Automation people surveyed were convinced that SAMNA far surpassed their stand-alones in terms of pure power, functionality, and user interface. In fact, they felt SAMNA flat out murdered them.

SAMNA offers high-powered features like screen-to-page fidelity, with on-screen display of special formats. Split screen editing. Automatic pagination and footnoting. Automatic search and replacement. Glossary of standard paragraphs. Easy addition, deletion, and movement of text. Electronic fold that lets you "fold" a wide page to compare left and right margins side by side. Zoom that shrinks a whole page until it's entirely displayed on screen. Three levels of Help that guide you through whatever command you're working on. And much, much more.

When the comparison was over, all 10 participants said SAMNA outclassed any word processor they'd ever used. And word processing was only the beginning.

Seamless Integration™ means SAMNA can work with text, math, line drawings, and more...without a break.

SAMNA lets you work with text, then switch to integrated five-function math, free-form line drawing, list management, or spelling checker as you need them. Without a break or interruption. Without going back to a window or changing screens. It gives you an uninterrupted flow of work that's faster, more natural, more productive.

SAMNA also accepts ASCII files directly from other software. So you can use it with Lotus 1-2-3,® dBase II,® even WordStar.®

The better you get, the faster SAMNA gets.

As you become more proficient in using SAMNA, you can go directly from one function to another without going back to a lengthy pull-down menu to select your next keystroke. It's as if SAMNA were thinking along with you, staying one step ahead of what you need to help you work faster.

Introducing SAMNA + : All of this, plus spreadsheet and Word Base Manager.™

Start with the power and productivity of SAMNA's word processing. And the Seamless Integration™ of additional functions for other business applications. Then include a state-of-the-art spreadsheet *and* SAMNA's exclusive Word Base Manager™ and you've got SAMNA + . Complete office automation in one package.

The integrated spreadsheet is interactive, allowing you to change a number in the spreadsheet and have the resulting change automatically made to a number in the accompanying text.

Word Base Manager™ can search through an entire disk in seconds to find every reference to a particular phrase, name, or date. So you no longer have to know the location of data to retrieve it when you need it. Word Base Manager™ also accepts any text format and doesn't require key word definition to create files.

Send $14.95 for a SAMNA software sampler and see the powerful word processing features. Or call 1-800-241-2065 (8AM-8PM EST, Mon.-Fri.) to arrange for a demonstration by the dealer nearest you.

Name _____

Title _____

Business Address _____

City _____ State _____ Zip _____

SAMNA

More powerful. More productive.

SAMNA Corporation, 2700 N.E. Expressway, Atlanta, GA 30345.

*SAMNA is available for IBM PC, XT, IBM-compatible, TI Professional, and DEC Rainbow microcomputers

The following names are trademarks of the following companies DEC and Rainbow, of Digital Equipment Corporation, IBM, of International Business Machines Corporation, WordStar, of MicroPro International Corporation, 1-2-3 and Lotus, of Lotus Development Corporation, dBase II, of Ashton-Tate Corporation, TI Professional, of Texas Instruments, Inc , Wang of Wang Laboratories

Circle 281 on reader service card

From the Software Shelf

PC World editors offer first impressions of recent software releases

This month: a box of disks chock-full of free software and demos, a program that looks over your spreadsheet's shoulder, a compiler to speed up dBASE II programs, and an easy-to-use office management tool

Mentor Preview Series

My mama used to tell me there's no such thing as a free lunch. But crafty and resourceful as she is, she also taught me to keep a keen eye peeled for bargains.

Mama, have I got a software package for you. It's the *Mentor Preview Series* from Janus Dysc, and it's more like a free breakfast. It's nourishing, it whets the appetite for a feast of games, tools, and application programs—and it comes with a recipe of sorts plastered on the box.

That terse box-top message conveys instructions for booting the system and is about all the written documentation you get with this first sampler from the Janus software catalog. Here's the deal: you buy a box of ten double-sided, double-density 5¼-inch floppy disks, which Janus has stamped with actual programs—practically gratis. The company is offering an amazing assemblage for a paltry $39.95. Quick calculation reveals that purchased separately, the assorted contents would set you back more than $150.

This is the software package as magazine: disks are organized into sections (games, demos, business packages); files constitute software "articles"—32 in all. You pick entries by number from a table of contents, and voilà! Every medium has its peculiarities, of course. In this case, you juggle disks rather than dodge blow-in cards or comb through vast expanses of ads without page numbers.

Like any good magazine, *Mentor Preview Series* is eclectic: a smattering of Scholastic Aptitude Test questions here, a music program there. You can sample a reading primer, a BASIC file handler, an arcade-style game, a time manager, an accounting package for the office. For *1-2-3* and *dBASE* devotees, templates make short work of maintaining mailing lists, address books, sales leads, and budget models. There's even a bone for electronic sleuths: *Two Heads of the Coin,* an exercise in interactive fiction, places Agatha Christie in RAM.

But the real stars of this first edition are Bob Wallace's *PC Write* (see "From the Software Shelf," *PCW,* Vol. 2, No. 12), a quick, easy-to-use word processor bulging with useful features; and its Shareware cousin, Jim Button's *PC-File III,* version 2. *PC-File* is a rudimentary but versatile data manager that's a snap to use. What the program lacks in on-line help, it gains with an intuitive design. Need data to play with? Check out *Letus A-B-C,* a *PC-File* index of article summaries from three months in the life of a batch of PC-specific magazines.

In short, rarely has disk media been so enticing. It's as though Maxell, seeking to sell tapes for your VCR, tossed in a few free movies from up-and-coming directors.

Having lavished such approbation on this package, I've got to heed Mama's advice about not being a Pollyanna. This is not the ultimate Instant Budget Software Library. In my foraging for Mentor's numerous gems, I also encountered a fair bit of gravel. Here, as elsewhere, there's a not-so-fine line between puffery and performance.

Like *Preview Pak*'s customers, the audience for *Mentor Preview Series* is amorphous: the package contains something for the heavy-duty BASIC programmer, the *1-2-3* power user, the student, the game buff. System requirements are nonstandard, to say the least; to use every last demo and template you'd need a PC equipped with 384K, a color graphics board, plus *1-2-3*, *dBASE II*, *WordStar*, and *MailMerge*.

The on-screen blurbs (product descriptions without demos) range from helpful to wholly hype. On balance, the company could just as easily have printed up a little something describing selections from its catalog. The demos themselves are uneven, but the *Personal Financial Management System* sampler is inexcusably austere, consisting of two meaningless screens to which no data can be added.

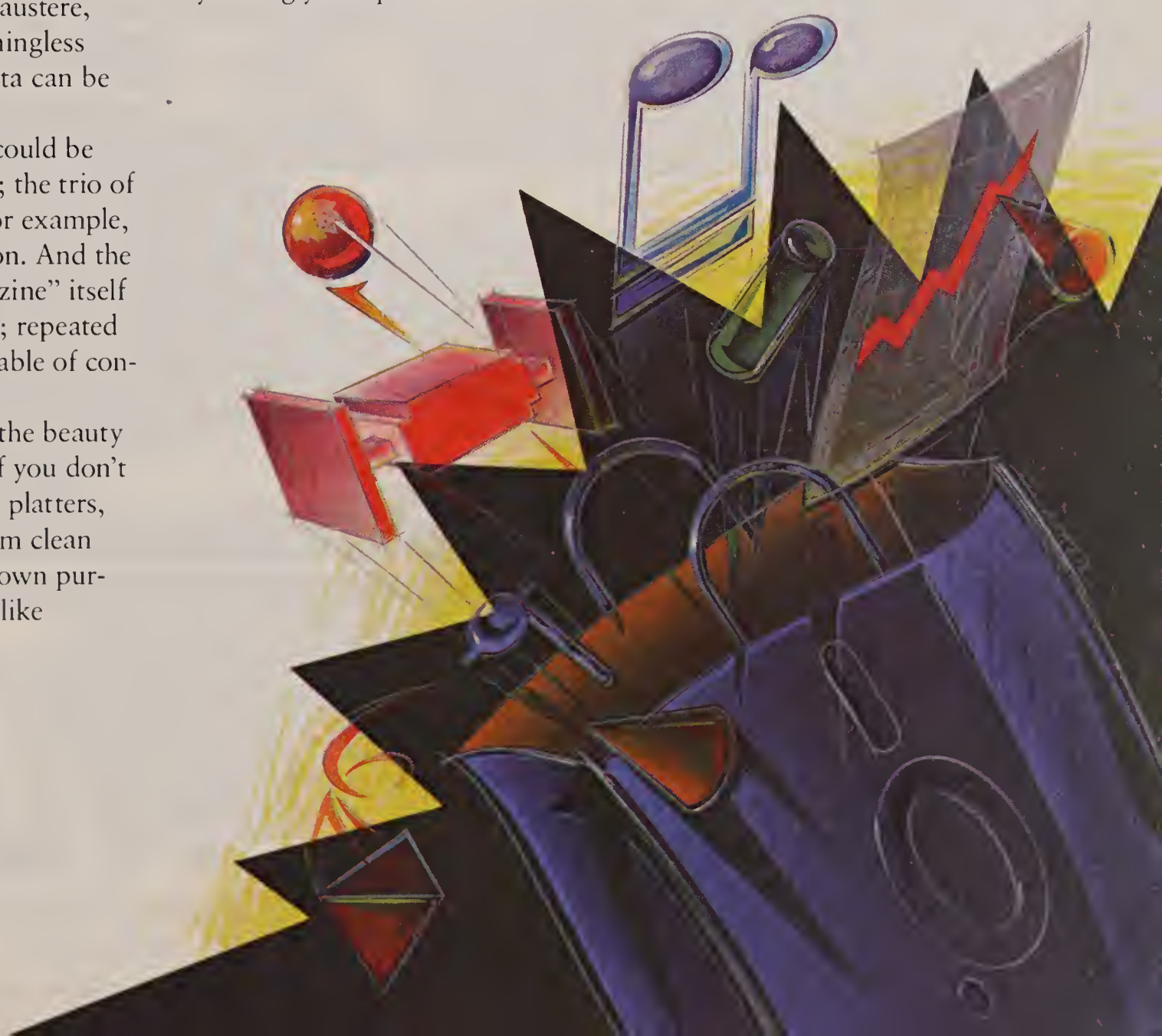
Where on-line help could be most useful, it's absent; the trio of handy DOS utilities, for example, cries out for explanation. And the structure of the "magazine" itself could stand refinement; repeated scrolling through the table of contents is a definite drag.

But I suppose that's the beauty of floppy disk media. If you don't like what's on the little platters, you can always wipe 'em clean and use them for your own purposes. Yes. Mama will like that. *—Ken Greenberg*

Mentor Preview Series
Janus Dysc Co.
1860 Barber Ln.
Milpitas, CA 95035
408/943-1600
List price: $39.95
Copy protection: No

The Spreadsheet Auditor

The Spreadsheet Auditor has one basic purpose: It lets you check your *1-2-3*, *VisiCalc*, or *SuperCalc* spreadsheet formulas—rather than just the results—for potentially disastrous errors and omissions. It accomplishes this simple miracle by taking your spreadsheet and printing out all cell formulas in standard spreadsheet-grid format. The spreadsheet programs themselves won't do this, and I still can't figure out why. With *1-2-3*, for example, you can either check your formulas ponderously, one at a time, on screen, by moving the cursor from cell to cell, or you can print out a virtually unreadable cell-by-cell listing that in no way resembles the spreadsheet you're attempting to verify. Seems silly, doesn't it? *The Spreadsheet Auditor* prints all formulas, grid coordinates, page numbers, and, in the case of *1-2-3*, all named and special ranges.



STATE OF THE ART.

These are some of the most popular PC display adapter cards in the world. Few shoppers realize the capabilities each board offers, or how they interact with other system components.

If you're serious about enhancing your PC, talk to the experts at PROGRESSIVE MICRO DISTRIBUTORS. Our Sales Staff and Product Information Services Department recommend enhancement products to get the job done. From display adapters to networks to multi-function boards, we stand behind every sale with working knowledge of one of the largest PC enhancement product lines anywhere.

See PROGRESSIVE MICRO DISTRIBUTORS' ad next to the Advertisers Index for all your State-of-the Art enhancements.

PROGRESSIVE MICRO DISTRIBUTORS

7000 Peachtree Industrial Boulevard
Norcross, Georgia 30071

Circle 63 on reader service card

New Version

Classic COBOL.

True mainframe COBOL for your microcomputer. Validated by the GSA at the highest possible level of compliance with the ANSI '74 standard. With Microsoft® COBOL, mainframe programmers can be productive on MS-DOS™ and Microsoft XENIX® microcomputers immediately.

Speed and Beauty.

High performance in a COBOL program comes mostly from the speed of the ISAM. And Microsoft COBOL 2.0 has the fastest ISAM on the market.

And our advanced screen handling capability lets you create the highly interactive programs that end users prefer.

We wrote the book.

It's no surprise that IBM,® DEC,® AT&T, H-P and Wang® all chose Microsoft COBOL for their MS-DOS machines. We know how to get the most out of their microcomputers. After all, we designed the operating system.

So call (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8080. We'll give you the name of your nearest Microsoft dealer or help you update to Microsoft COBOL 2.0.

MICROSOFT®
The High Performance Software™

Certified High Level Compiler:
- GSA validation at the Federal High Level of compliance with the ANSI '74 standard.
- Built in sort-merge, chaining, dynamic calling, and overlays.

Fast multi-key ISAM:
- Split-keys and duplicate keys.
- Benchmark results of 5000 reads and writes to an ISAM file:

	Microsoft COBOL 2.0	Realia COBOL	MicroFocus® Native Code	Ryan-McFarland® COBOL 2.0
hours: minutes	1:32	1:56	2:58	3:30

Interactive extended screen section:
- Cursor positioning, auto skip, automatic data field formatting.
- ACCEPT and DISPLAY data by the screen full.

Productivity utilities:
- Interactive Symbolic Debugger.
- Rebuild file recovery utility restores corrupted ISAM files.

Price:
- $700 for compiler and utilities.
- No runtime royalty fees.

Minimum System requirements:
- MS-DOS 2.0 or later, 192K RAM, and one disk drive.
- Xenix 286, 512K RAM, and one disk drive.

Microsoft and Xenix are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation. IBM is a registered trademark of International Business Machines. DEC is a registered trademark of Digital Equipment Corp. Wang is a registered trademark of Wang Laboratories, Inc. MicroFocus is a registered trademark of MicroFocus. Ryan-McFarland is a registered trademark of Ryan-McFarland.

Arlington Computer Products
800-548-5105

IBM PC $1699
2 DRIVES, 256K
IBM PC $2025
2 DRIVES, 256K, MONO/PRINTER ADAPTER, MONOCHROME MONITOR
Call for quotes on other configurations.

DISK DRIVES

TANDON TM 100-2	$119
CDC 9409	$115
CDC 9428	$125
SHUGART SA455	$ 95
TEAC FD55B	$105
TEAC FD55F	$129
QUME QT142A for IBM portable	$140
MICRO SCI 10MB 1/2 HT. w/controller	$639
MICRO SCI 20MB 1/2 HT. w/controller	$865

PRINTERS

OKIDATA
92 IBM $369
93 IBM $575
84 IBM $649
EPSON call
SILVER REED
EXP 400 $259
EXP 500 $299
EXP 550 $425
EXP 770 $749
TOSHIBA
1340 $575
1351 $1199

★★★ $PECIAL$ ★★★

AST 6 PAK PLUS 384K	$345
QUADBOARD w/384K	$335
EVEREX MULTI-FUNCTION w/384K	$285
64K RAM CHIPS (Bank of 9)	$18
SHUGART SA455	$95

MONITORS

AMDEK
310 A $155
COLOR 500 $375
COLOR 600 $415
COLOR 700 $499
COLOR 710 $575
PRICETON
MAX12 $169
HX12 $449
TAXAN call

BOARDS

STB MONOCHROME CARD	$165
HERCULES COLOR CARD	$165
HERCULES GRAPHICS CARD	$339
PERSYST COLOR CARD	$149
PERSYST "BOB"	call
TECHMAR GRAPHICS MASTER	$495

Arlington Computer Products
450 E. HIGGINS RD.
ELK GROVE, IL 60007
master charge VISA
PRICES SUBJECT TO CHANGE
800-548-5105
IN ILLINOIS (312)882-3724
Circle 825 on reader service card

To prepare a *1-2-3*, *SuperCalc*, or *SuperCalc 2* spreadsheet for the *Auditor*, you must first generate a print file. *VisiCalc* files can be used as is. You select options from a series of menus to designate spreadsheet (or print) source files and determine the format of "audited" output files. *The Spreadsheet Auditor*'s output files can be sent to a print file or directly to a printer or the screen. You determine the output file's width and number of lines per page, and choose whether or not to print grid coordinates and use printer form feeds. You can designate more elaborate printer instructions for compressed print, form length, underlining, and boldface.

Column width can be set to default, which means the column will be as wide as its widest entry, or specified, which causes long formulas to wrap into the following row or rows much like a newspaper column. I prefer default mode because long formulas are easier to read in single lines than wrapped into several lines. However, that can make for some extraordinarily wide printouts that require cutting and pasting. You can also designate the range of rows to be processed. Your final choice before auditing a spreadsheet is whether to save or delete input and output configurations for later use; this option is useful if you're processing multiple spreadsheets. Once the program has performed its magic, you can save the spreadsheet and source disk for further processing or return to the *Auditor*'s opening menu.

The well-written manual includes a detailed tutorial with samples, a "Quick Guide" to the program, a reference section, and a short set of suggestions for designing spreadsheets.

Spreadsheet fans take note: Consumers Software plans to offer version 2.0 of *The Spreadsheet Auditor* by the time this review is published. Version 2.0 reportedly adds *Symphony* to its repertoire, generates an "audit trail" of spreadsheet macros, prints wide spreadsheets sideways, and processes files as they are stored on disk without requiring an intermediate print file. One good thing follows another.

At $99, *The Spreadsheet Auditor* offers an all-too-rare opportunity to cover your assumptions.
–Reed McManus

The Spreadsheet Auditor
Consumers Software Inc.
314 E. Holly St. #106C
Bellingham, WA 98225
800/645-5501
List price: $99
Requirements: 128K, one disk drive
Copy protection: Yes

dB/Compiler

A compiler for *dBASE II*? Usually we associate compilers with "real" computer languages like Pascal and C, not data management programs like *dBASE II*. But *dBASE II* incorporates a powerful programming language that is used by thousands of software developers to create serious business applications.

Raging C.

Concise structure and fast execution make C the ideal language for applications and system-level programming.

And compared with other MS™-DOS C compilers, Microsoft® C consistently produces the fastest executable code.

It supports the full C language and includes an extensive library of subroutines that implement most UNIX™-compatible functions.

Small, medium, compact, and large memory models give you flexibility in selecting the addressing requirements of your software. Programs can be designed to make effective use of the available memory of your computer, up to one megabyte.

MICROSOFT®
The High Performance Software

Microsoft C Compiler provides you with a complete development system including the compiler, run time library, linker and library manager, and full support of MS-DOS 2.0 directory structure (pathnames) and I/O redirection.

How do programmers feel about Microsoft C?

"In the top category for its quick compile and execution time, small incremental code, best documentation, and consistent reliability."**
—Ralph Phraner, *BYTE Magazine*

"Best for software development."
—Bill Hunt, *PC Tech Journal*

"Produces good, tight-running programs."
—Peter Norton, *Softalk*

Call 800-426-9400 to order the raging C. $500*

In Washington State, call 206-828-8088. Ask for operator D5, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft C in action.

*Price exclusive of handling and Washington State sales tax.
Microsoft is a registered trademark and MS is a trademark of Microsoft Corporation.
UNIX is a trademark of Bell Laboratories.

**Reprinted with permission, *BYTE Magazine*, August '83.

micromission

VISA 1-800-544-5182 MasterCard
302-762-7820

222 Philadelphia Pike • Wilmington, DE 19809

FEATURES

IBM PC, XT, Jr., AT ACCESSORIES!!
64K RAM KITS $20!!!

PRINTERS

EPSON RX 80	$239
EPSON FX 80	$379
EPSON FX 100	$595
OKIDATA ML 92	$379
OKIDATA ML 93	CALL
OKIDATA ML 84	CALL
TOSHIBA 1340	$595
TOSHIBA 1351	$1249
NEC 2050 spinwriter	$749
NEC 3550 spinwriter	$1389
Dataproducts 8050 color printer "IBM's Choice"	$1395
NEC 8850	$1759
SG 10	$249
SG 15	$410
NEC PIN WRITERS	CALL
All Data Products Printers	CALL

BOARDS

AST ADVANTAGE BOARD	$369
QUADBOARD MULTIFUNCTION BOARD with 64K	$259
AST SIX PAK with 64K	$249
HERCULES GRAPHICS CARD	$329
AMDEK MAI CARD	CALL
ORCHID TURBO 186 with 256K	CALL
QUADCOLOR I & II	CALL
ALL AST PRODUCTS	CALL
TECMAR ALL PRODUCTS	CALL

MONITORS

QUADRAM AMBERCHROME	$149
AMDEK 310 A Amber Monitor	CALL
PGS MAX 12 Amber Monitor	$169
QUADRAM QUADCHROME RGB Monitor	$459
PGS HX-12 RGB Monitor	$459
ALL AMDEK Monitors	CALL

SOFTWARE

LOTUS 1-2-3	$349
SYMPHONY	$479
ASH TON-TATE D-Base III	$409
FRAMEWORK	CALL
MULTI-MATE word processor	CALL
SAMNA word processor	CALL
IUS	CALL

MODEMS

NOVATION SUPER CAT 300/1200	$369
HAYES 1200 External	CALL
HAYES 1200 B Internal	CALL
HAYES 300	CALL

ACCESSORIES

DYSAN DS/DD Diskettes 10 box	$35
IRMA replaces 3278's with PC's	$875
MICROFAZER print buffer 8K	$129
Flip n' File	$9.95
ISOBAR Surge Protectors, starting at	$59
PANOSONIC Half/height disc drives	$129
TANDON TM100-2 disc drives	CALL
XT Compatible 10 MB hard disc	$695
WYSE 50 terminals	$509

QUALITY PRODUCTS AT COMPETITIVE PRICES

FREE SHIPPING

IBM IS A TRADEMARK OF IBM, CORP.

Circle 939 on reader service card

The *dBASE II* language has a lot going for it. You can create a functioning application in a fraction of the time it would take to do the job using a general purpose language like BASIC. But as a software tool *dBASE II* has some drawbacks. One problem is the excruciating slowness of many applications written in *dBASE II*, especially those that perform sorts or indexes on large data bases.

A second problem affects consultants who create applications using *dBASE II*. Anyone who wants to use such a system has to buy a copy of *dBASE II*, unless the consultant has included with the application a special *dBASE II* interpreter called *RunTime*. *dB/Compiler* from WordTech solves both problems. It speeds up *dBASE* applications and lets them run independently of *dBASE II*.

How do you use *dB/Compiler?* Simple. Just load it from DOS, and type **DBC** and the name of the previously created *dBASE II* command file you want to compile. *dB/Compiler* churns out a compiled version of the command file and of any other files called by that command file. You can then use WordTech's linker to produce an executable (.EXE) file that reads in the compiled code as needed when the application is run.

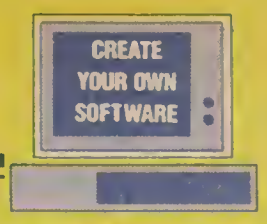
For the technical purist, we should note that the word *compiled* is used loosely here. A true compiler is a sort of programmer's Cuisinart, a software gizmo that slices, dices, and minces software instructions all the way down to the 0s and 1s of machine-readable object code. *dB/Compiler* is actually a pseudocompiler: it does not reduce *dBASE II* files to binary form, but rather to a special intermediate code.

Technoquibbles aside, the benefits are the same as a true compiler's: The resulting application uses less disk space, runs faster, and is encrypted to prevent others from using your programming ideas or altering your code. All software products have shortcomings, of course, and this one is no exception. Unfortunately, *dB/Compiler* balks at a few *dBASE II* programming techniques, including some uses of the macro substitution function. Programs that use these techniques must be rewritten before they can be compiled.

WordTech estimates that any *dBASE II* application, once compiled, will run about 20 percent faster, and my tests confirm this claim. But the real benefit comes in applications that sort or index very large data bases. Since *dB/Compiler* dramatically speeds up *dBASE II*'s sluggish sorting and indexing commands, compiling causes applications that make heavy use of these commands to run up to five times faster.

Currently, users of *dBASE II* who wish to improve the performance of their programs must choose between upgrading them to *dBASE III* or compiling them with *dB/Compiler*. Fortunately, with the pending release of a version of *dB/Compiler* for *dBASE III*, such a decision will no longer be necessary, and users who took the upgrade route can now enjoy the benefits of compilation as well.

Contemporary Programming & Software Design Series



TRIAL EXAMINATION ORDER FORM

YES! I would like to learn how to make any computer do exactly what I want it to do and would like to examine the first module in the Series absolutely free. If I decide to keep it, I will pay just $24.95 plus $2.25 shipping and handling. I will then receive future modules automatically, one every 4 to 6 weeks. Each of the 10 modules in the Series is $24.95 plus $2.25 shipping and handling and comes on the same 15-day Trial Examination basis. There is no minimum number of modules that I must buy and I may cancel at any time simply by notifying you.

If I do not choose to keep the first module, I will return all materials in good condition and pay nothing. Future modules will be canceled and I will be under no further obligation.

Name_____
Please Print

Street_____

City/State/ZIP_____

Phone Number ( )_____

The interactive disks included with this series will run only on IBM or IBM compatible computers. All orders subject to approval and payable in U.S. funds only. Available in U.S. and Canada only.

2507-055

Ten modules teach you how to write your own programs or modify existing software to fit your needs:

- Getting Started in Programming & Software Design
- Attacking the Problem
- How to Design the Solution and Arrange It Logically
- Coding the Program: High Level Languages
- Coding the Program: Assembly Language
- Testing and Debugging Made Easy
- Creating Meaningful Documentation
- Modifying & Updating Existing Programs
- Tools & Tricks for Program Design
- Writing Advanced Programs

Post Office
Will Not
Deliver Without
First Class
Stamp

McGraw-Hill
Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

Make Any Computer Do Exactly What You Want With McGraw-Hill's

Contemporary Programming & Software Design Series

From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

That's why McGraw-Hill's new Contemporary Programming and Software Design Series teaches you how to create your own software . . . either from scratch or by making key modifications to existing programs.

There is nothing magical about it. You learn the process of building a computer program step-by-step with McGraw-Hill *Concept Modules* sent to you one at a time, once a month. Each of the ten modules in the Series takes you through an important step in the development of the structure and detailed logic of a program, including testing, debugging, and documentation.

Unique Interactive Hands-On Instruction

Each module includes an easy-to-understand guide PLUS a 5¼" floppy disk containing typical programs and interactive instruction that you can run on any IBM or IBM-compatible computer for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.

Learn the Foundation of All Computer Languages

Although the Series teaches you programming procedures, it is not aimed at any one language or machine. Why? Because 95% of the programming process is carried out using design techniques that are independent of a specific language or machine. Nevertheless, we include enough training in BASIC and machine language to get you started. You'll find that the whole process of learning new languages will be greatly accelerated once you complete the Series.

Create a Complete, Customized Family Financial Package As You Learn

The sample programs you work with throughout the Series are excellent learning tools. But they're more than that. By combining the sample programs onto one master disk, you'll create your own family financial package that will help you balance your budget, figure loan amortization, and much more. And — of course — you'll be able to further modify your financial package to fit your own specific needs!

15-Day No-Risk Trial

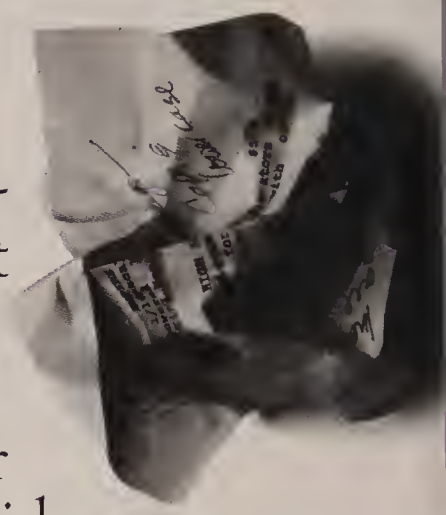
To order your first module without risk, send the postage-paid card today. Examine the first module for 15 days and see how the Series will help you make any computer do exactly what you want it to do!

If someone has beaten you to the card, write to us for ordering information about the Contemporary Programming and Software Design Series.

McGraw-Hill
Continuing Education Center
3939 Wisconsin Avenue
Washington, DC 20016

IBM is a registered trademark of International Business Machines, Inc

Quick doesn't have to

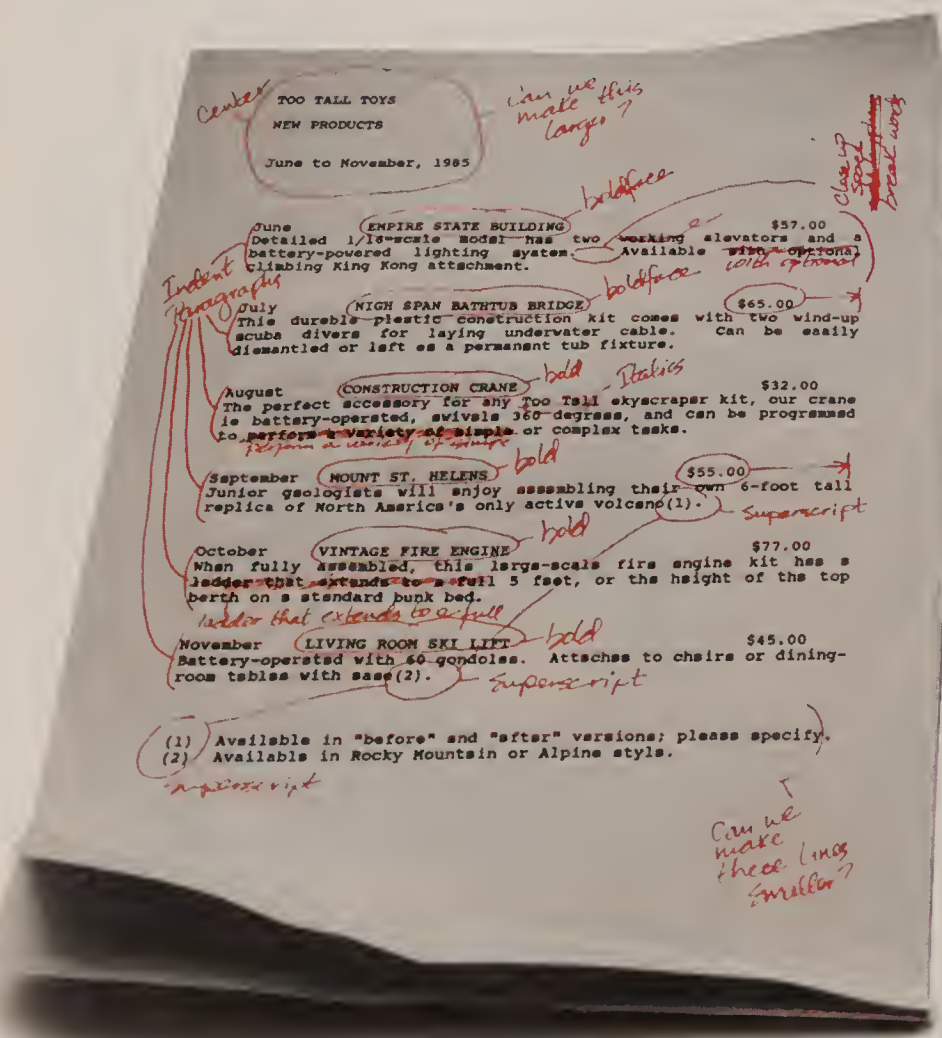


Before Microsoft® Word you had to choose between quick and clean. Producing professional looking documents meant going through draft after draft after draft after draft.

The new Microsoft Word is different. You don't have to practice to make perfect. You can use the full power of the IBM® PC to eliminate the drafts. And give your ideas sudden impact.

Quick quality.

With Word, what you see on the screen is what you'll see on the page. You can preview and design documents. And instantly see the effect of your changes. (No more playing blindman's bluff between the screen and the printer.) Now you can breathe vitality into blocks of lifeless text.



TOO TALL TOYS
NEW PRODUCTS

June to November, 1985

June — EMPIRE STATE BUILDING — $57.00
Detailed 1/16-scale model has two working elevators and a battery-powered lighting system. Available with optional climbing King Kong attachment.

July — HIGH SPAN BATHTUB BRIDGE — $65.00
This durable plastic construction kit comes with two wind-up scuba divers for laying underwater cable. Can be easily dismantled or left as a permanent tub fixture.

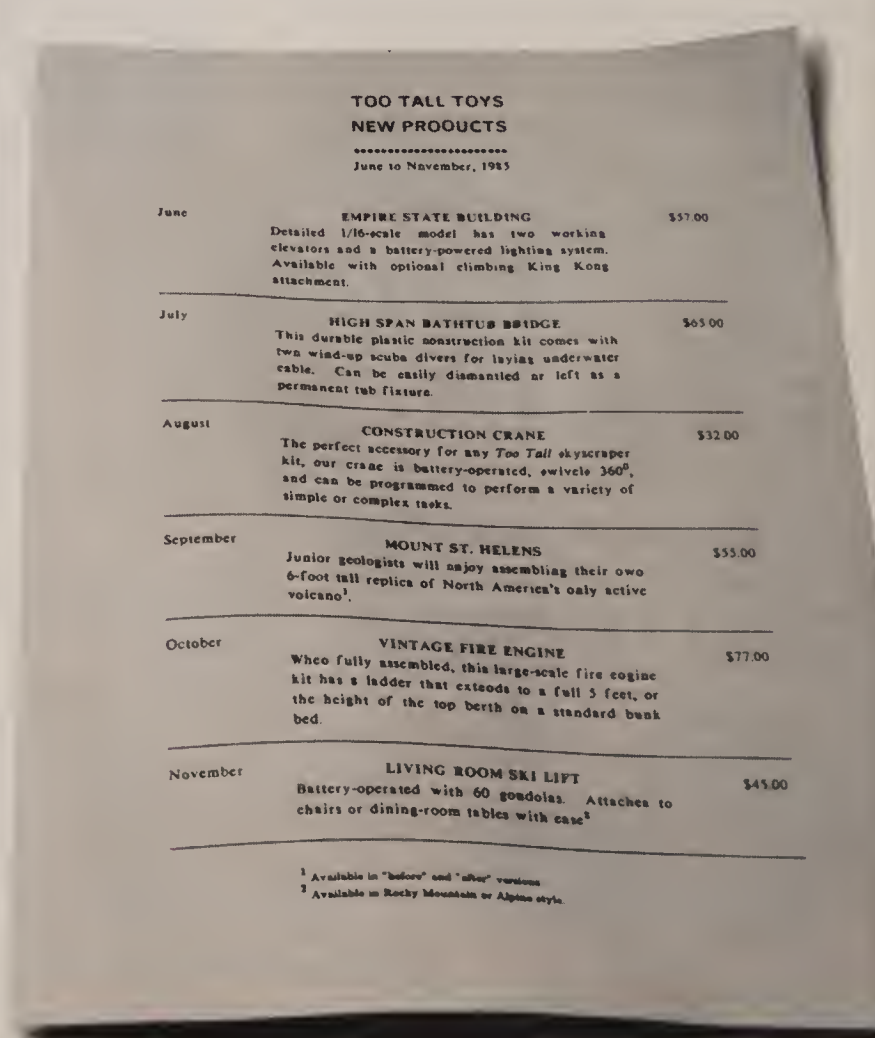
August — CONSTRUCTION CRANE — $32.00
The perfect accessory for any Too Tall skyscraper kit, our crane is battery-operated, swivels 360 degrees, and can be programmed to perform a variety of simple or complex tasks.

September — MOUNT ST. HELENS — $55.00
Junior geologists will enjoy assembling their own 6-foot tall replica of North America's only active volcano(1).

October — VINTAGE FIRE ENGINE — $77.00
When fully assembled, this large-scale fire engine kit has a ladder that extends to a full 5 feet, or the height of the top berth on a standard bunk bed.

November — LIVING ROOM SKI LIFT — $45.00
Battery-operated with 60 gondolas. Attaches to chairs or dining-room tables with ease(2).

(1) Available in "before" and "after" versions; please specify.
(2) Available in Rocky Mountain or Alpine style.



TOO TALL TOYS
NEW PRODUCTS

June to November, 1985

June	EMPIRE STATE BUILDING Detailed 1/16-scale model has two working elevators and a battery-powered lighting system. Available with optional climbing King Kong attachment.	$57.00
July	HIGH SPAN BATHTUB BRIDGE This durable plastic construction kit comes with two wind-up scuba divers for laying underwater cable. Can be easily dismantled or left as a permanent tub fixture.	$65.00
August	CONSTRUCTION CRANE The perfect accessory for any *Too Tall* skyscraper kit, our crane is battery-operated, swivels 360°, and can be programmed to perform a variety of simple or complex tasks.	$32.00
September	MOUNT ST. HELENS Junior geologists will enjoy assembling their own 6-foot tall replica of North America's only active volcano[1].	$55.00
October	VINTAGE FIRE ENGINE When fully assembled, this large-scale fire engine kit has a ladder that extends to a full 5 feet, or the height of the top berth on a standard bunk bed.	$77.00
November	LIVING ROOM SKI LIFT Battery-operated with 60 gondolas. Attaches to chairs or dining-room tables with ease[2]	$45.00

[1] Available in "before" and "after" versions
[2] Available in Rocky Mountain or Alpine style.

Their first draft vs. our first draft.

be dirty.

Highlight pithy phrases, flag important words, drive home conclusions. With **boldface,** underline and *italics,* superscript and subscript. (No more hieroglyphic codes.)

Microsoft Word gets unmatched professional quality from dot matrix, daisy wheel and ink jet printers. And on the new laser printers, it produces stunning results.

It lets you execute commands and edit text faster, with simple keystrokes or the optional Microsoft Mouse. And, Word has windows so you can have multiple documents on the screen, and you can easily cut and paste between them.

MICROSOFT®
The High Performance Software™

Word also includes a computer-based training disk that gets you up to speed quickly. Plus, a new comprehensive manual.

100% money-back guarantee.

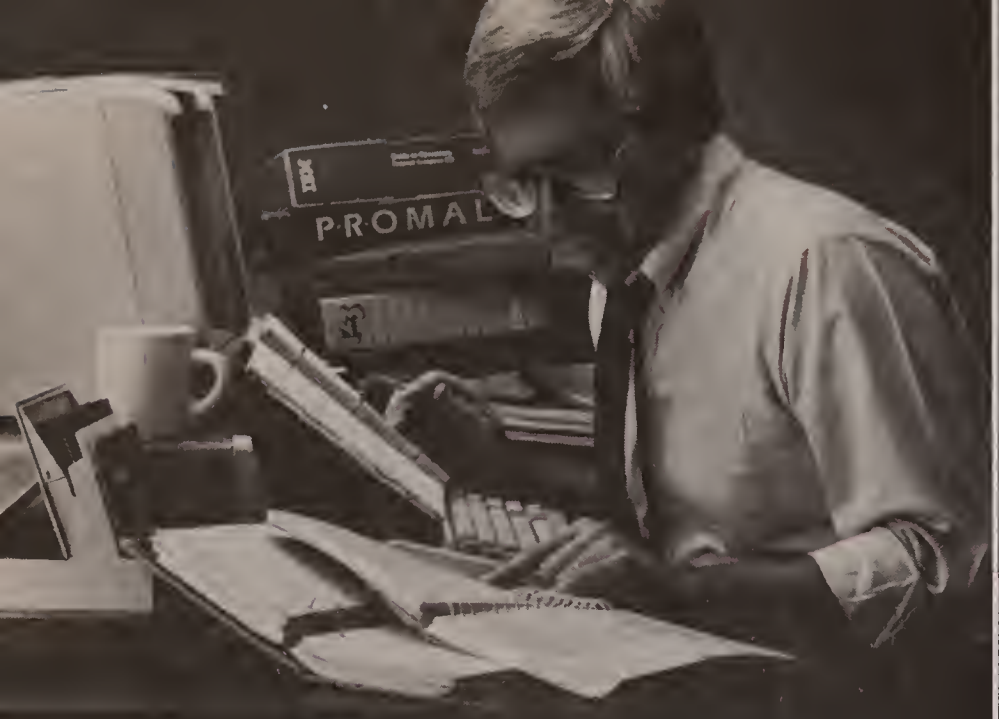
You don't have to take our word about Word. Buy the new Microsoft Word from a participating dealer and if you're not satisfied for any reason, return it to the dealer within 30 days and he'll give you your money back.*

How do we get higher performance out of the PC? Simple, our MS-DOS® operating system tells the IBM PC how to think. And our BASIC is the language spoken by nine out of ten microcomputers worldwide.

So, if you want to clean up your act, act quick. Call (800) 426-9400. In Washington State, Alaska, Hawaii and Canada, call (206) 828-8088. And ask for the name of your nearest Microsoft dealer.

Microsoft and MS-DOS are registered trademarks and The High Performance Software is a trademark of Microsoft Corporation. IBM is a registered trademark of International Business Machines.

*Offer good in the United States on IBM PC versions of Microsoft Word purchased on or before August 31, 1985.



Instead of this... ...you can have this with this!

$14.95

Why waste time digging through cumbersome manuals for operating commands? PC-DocuMate™ templates put computer commands at your fingertips for the IBM® PC, PC-XT, Compaq,® Apple® IIe and Commodore® 64.

You'll have quick reference for needed commands, options and formats right on your keyboard with a PC-DocuMate template.

Our professionally designed, two-sided templates are made of durable, non-glare plastic. Satisfaction is guaranteed—fully—or your money back.

Templates Now Available—

IBM PC/XT and COMPAQ: DOS/BASIC (2.0 & 2.1) • 1-2-3 • Symphony • dBASE II • dBASE III • Framework • MultiMate • Wordstar • EasyWriter II • MULTIPLAN (IBM or Microsoft) • PeachText 5000 • SUPERCALC³ • VisiCalc • TURBO Pascal • WordPerfect • VOLKSWRITER DELUXE • Do-It-Yourself.

PCjr: DOS/BASIC 2.10 • dBASE II • Do-It-Yourself.

COMMODORE 64 (Single-sided): C-64 BASIC • EasyScript • CalcResult • Do-It-Yourself.

Apple IIe: AppleWriter II • WordStar • VisiCalc • dBASE II • Quickfile • Do-It-Yourself.

How to Order:

To order by credit card call toll free

1-800-762-7874

(In NC call 919-787-7703)

Or mail us your personal check, money order or MasterCard/Visa information. NC residents include 4.5% sales tax. Please *add $1.50* for shipping and handling per order. (Foreign orders, except Canada, add $15.00 per order). U.S. funds only. No CODs.

Our Guarantee: Use your template for 20 days. If you are not completely satisfied return it to us (undamaged) for a full refund.

SMA

Systems Management Associates
3700 Computer Drive, Dept. W-1
Raleigh, North Carolina 27609

Circle 70 on reader service card

For Ashton-Tate, the arrival of a compiler for its star program is both an honor and an insult. It's an honor because it confirms *dBASE II* as a serious programming language. The insult is to Ashton-Tate's bottom line: Instead of consultants' buying a copy of *dBASE II* or *RunTime* for every system sold, they need only pay for *dB/Compiler* once. No wonder Ashton-Tate never got around to developing a compiler itself. *–Ted Nace*

dB/Compiler
WordTech Systems
P.O. Box 1747
Orinda, CA 94563
415/254-0900
List price: $750
Requirements: 256K, one disk drive
Copy protection: Yes

Offix

It seems to be a glaring paradox of our high-tech times that software programs designed to simplify our lives are often accompanied by manuals of baleful complexity. No matter the seductive promises made by flashy packaging–you must still spend tedious hours fighting off somnambulistic prose and wrestling labyrinthine instructions into submission.

It was therefore with no little trepidation that I peeled back the shrinkwrap on *Offix*, especially when I noted that Emerging Technologies was promoting it as the world's easiest-to-use integrated software. To my surprise, I

How Do I Choose the Right Personal Computer Monitor?

Gould... Innovation and Quality in Hard Copy Color Graphics

You need a plotter that's compatible with your hardware, software and, especially, you.

More and more companies are discovering that color graphics help them communicate faster and more persuasively.

When you make this discovery, you'll want a Colorwriter™ pen plotter from Gould. Because Colorwriters are easy to use, and can meet all of your business and technical graphic needs. They'll work with virtually any computer and the most popular software packages available.

Whether you want simple bar charts or complicated CAD/CAM drawings in 8½″ x 11″ or 11″ x 17″ formats, we've got a plotter to suit your needs and your budget. Plus, we've got a unique automatic chart advance option for volume graphics applications.

When you buy a Gould Colorwriter plotter you're getting 45 years of proven experience in hard copy graphics technology. That's why you also get one of the best warranties in the business.

For more information and the name of the Colorwriter dealer nearest you, call toll free **800-447-4700,** operator 99. Or write Gould Inc., Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114.

Gould Colorwriter. The compatible plotters.

GOULD
Electronics

Circle 996 on reader service card

couldn't find the manual. After a futile search through the packing material, I finally opened a general information booklet enclosed with *Offix*, hoping to solve this mystery.

You guessed it—no manual. The package also lacks spreadsheet, graphics, and communications capabilities—functions usually found with integrated software. *Offix* is actually a multifunction tool with some data base management capabilities as well as word processing, filing, forms design, and report generation features.

The good folks at Emerging Technologies have provided everything we need to know about *Offix* on disk. With the aid of disk-based tutorials, help screens, and little pop-up windows with menus and error messages, this personal office system takes pains to ensure that even the novice PC user will quickly feel productive.

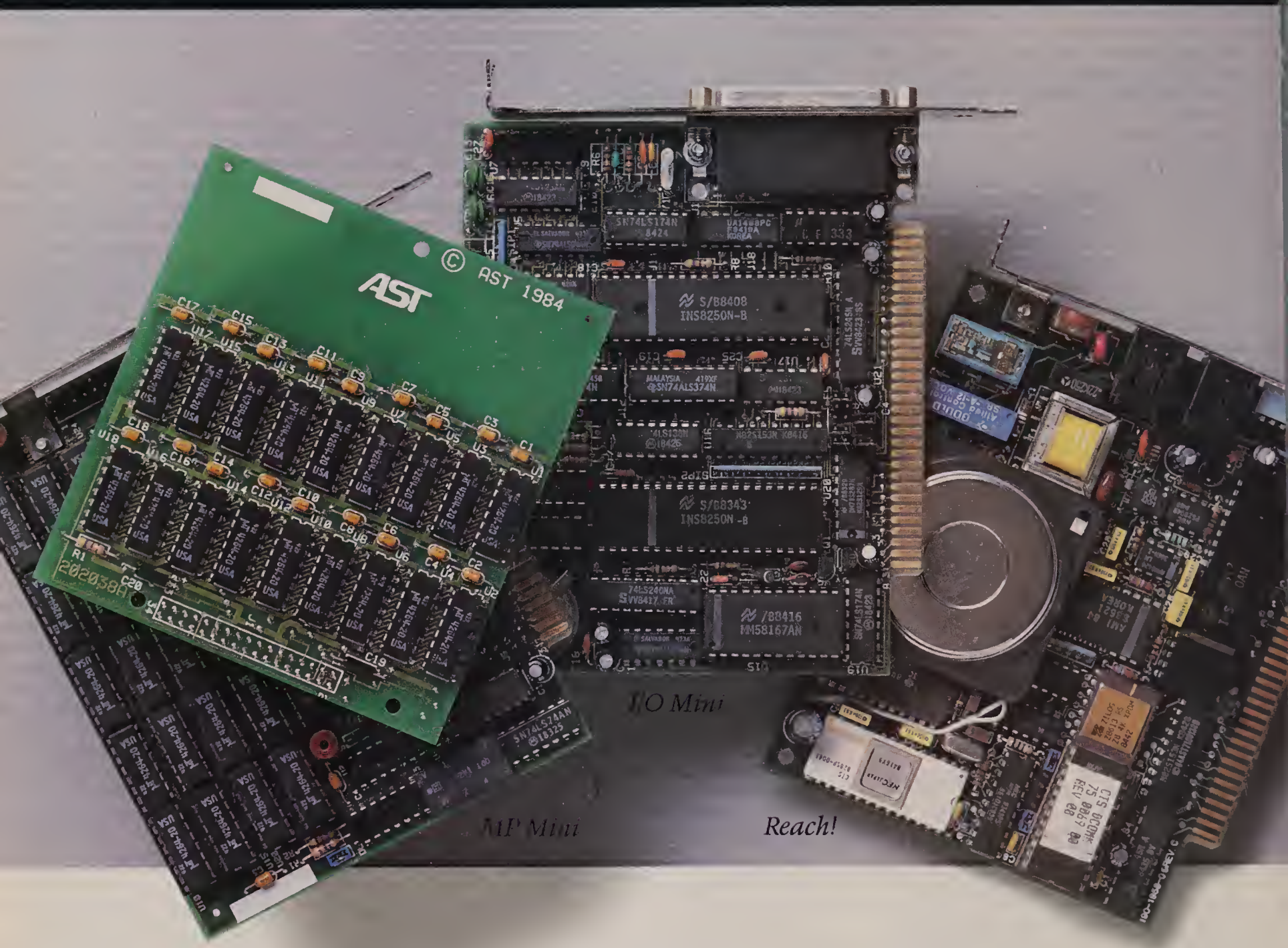
Offix depicts on screen an office environment called "The Cabinet Room," which features (what else?) two filing cabinets. To enhance the illusion, as you begin to use the program a three-dimensional graphic appears, representing an open drawer with file folders. Instead of the terms *file*, *record*, and *field*, *Offix* uses common office lingo: Each *cabinet* has three *drawers*, and each drawer contains 100 *folders*, which in turn can be filled with *forms*.

Opening any file folder—as simple as pressing T to "take out a folder" and O to "open a

Will It Work with My PC?

Before you can experience the full capabilities a high performance monitor offers, it has to work with your personal computer. That's why Princeton Graphic Systems makes high resolution monitors compatible with most popular brands of personal computers. IBM, Compaq, Corona, Apple and more. But we go one step further. By paying close attention to ergonomic detail, we make Princeton Graphic Systems monitors compatible with you, the computer system user...

Short Slot Length, Big Board Strength



AST's new Mini Series packs plenty of power into short slots in IBM PC-XTs, Portable PCs, 3270 PCs and their compatibles. These short cards are super flexible—all three work in the 8th slot of your PC-XT or 3270 PC, and of course, you can plug them into long slots too.

Store with the MP Mini.™
This ideal memory expander adds 64-384K to your 256K system, bringing memory to a maximum of 640K. Comes with SuperPak™ utilities for faster data access, plus concurrent data input and printing.

Connect with the I/O Mini.™
Powerful I/O expansion adds up to 2 serial ports and a parallel port to accommodate printers, plotters, mice, modems and more. Includes SuperPak utilities and battery-backed clock/calendar, which is 3270 PC compatible. An excellent choice for the XT or Portable PC.

Communicate with Reach!.™
AST's intelligent 300/1200 baud internal modem works in all members of the IBM PC/XT family, including the PC-AT. Reach! connects you to the world of information services, electronic mail, on-line databases, bulletin boards, and PC-to-PC information transfer. With Hayes command compatibility, Reach! can use the communications features of such leading business programs as Symphony™ and Framework.™ And popular Crosstalk XVI® software is included.

For details, call our Customer Service Information Center (714) 863-1333 Ext. 5249 or visit your AST dealer. AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714. TWX 753699 ASTR UR.

MP Mini, I/O Mini, Reach! and SuperPak trademarks of AST Research, Inc. IBM PC, XT, AT, Portable PC and 3270 PC trademarks of International Business Machines, Corp. Hayes Smartmodem trademark of Hayes Microcomputer Products, Inc. Framework trademark of Ashton-Tate. Symphony trademark of Lotus Development Corp. Crosstalk XVI registered trademark of Microstuf, Inc.

Circle 22 on reader service card

folder"—provides access to *Offix*'s main features: electronic filing, word processing, forms design, and report generation.

Once a folder is open, the *Offix* word processor is activated. Basic editing functions, coupled with a capacity for block moves, boldfacing, underlining, and merging files—including non-*Offix* files—make this feature more than adequate for basic correspondence and report writing.

With the word processor you can also design a data entry form with as many as 50 entry blanks. (This is analogous to creating a data base template for records having 50 fields each.) You design an *Offix* form as you would on a typewriter, typing labels for various entries and underscoring fields to be filled in. *Offix* lets you fill in more data than a blank has spaces, with excess characters scrolling off the screen to the left. There is also a Forms Search feature that lets you set ten search criteria (for forms) in an open folder. Forms (records) that match the search criteria then appear on screen one at time. A Form Letter function enables you to print envelopes, labels, and form documents, merging information from the file folders you created.

If there's a glaring shortcoming to this "integrated package," it's the lack of a spreadsheet function. You can produce a report in columnar format using *Offix* data folders. Items in a column can be sorted according to specified criteria, and any column containing numbers can be totaled. But these capabilities are not equivalent to a spreadsheet function.

Does It Give Me A Bright, Sharp Image?

Take a close-up look at the display. Bright, crisp characters and sharp, colorful graphics mean you're getting a high-quality image. The kind of image that comes with every Princeton Graphic Systems' monitor. Because Princeton Graphic Systems combines flicker-free technology, a fine dot pitch, and a nonglare screen to give you an image that *PC World's* World Class Survey rates number 1 . . .

THE SYMPHONY SOLUTION

1 MB $695

PUT 896K OF DOS ADDRESSABLE RAM IN YOUR IBM PC, NOW!

That's right! We have broken through the memory limits on the IBM PC and COMPAQ.

The ODM™ card now allows the PC to address through DOS 896K of usable RAM for packages such as **SYMPHONY**, **FRAMEWORK** and **LOTUS 1-2-3**. Within SYMPHONY this will enable you to effectively double your potential spreadsheet size and take full advantage of SYMPHONY's new windowing, graphing and data base functions.

The ODM™ card can be installed with a full megabyte of RAM, using 256K RAMs, and can be configured with any existing RAM, either on the mother board or on other RAM cards.

The electronic disk feature, which doesn't occupy any of the memory located within the new 896K boundary of DOS addressable RAM, is truly a first-of-a-kind product.

All or part of the ODM's™ RAM can be configured as one or multiple electronic disks. The card also has an optional battery back-up module which enables the RAM not to lose data for up to two hours when temporary power outages occur.

Optional Plug-On Features

- Serial port, parallel port, game port and real time clock
- Battery back-up

ØK	$295
256K	$395
512K	$495
768K	$595

Prices subject to change without notice.

See us at
COMDEX/Spring '85
May 6-9, 1985
Atlanta Apparel Mart
Atlanta, Georgia
Booth 6549

MEGA-OMEGA SYSTEMS, INC.
5217 ROSS AVE.
SUITE 710 LB 122
DALLAS, TX 75206
(214) 828-0960

IBM PC is a registered trademark of International Business Machines Corporation. LOTUS 1-2-3 and SYMPHONY are registered trademarks of Lotus Development Corporation
FRAMEWORK is a registered trademark of Ashton-Tate Corporation. COMPAQ is a registered trademark of COMPAQ Computer Corporation

Circle 1 on reader service card

Probably the most refreshing thing about *Offix* is the ease with which you learn to manipulate all these features and more—without a manual. When you try an *Offix* function for the first time, a tutorial appears automatically. Tutorials range from a single screen (for instructions on how to label a form) to 33 lessons (for the word processor). You can turn any of the tutorials on or off as needed.

Should you make a mistake, a window pops up with an error message, usually one or two sentences, that provides a clear idea of where you've gone astray. Menus and help screens are always a function key away. And the help screens provide a paragraph or two of detailed explanation for most commands.

Offix integrates the essential features of word processing and data management in a simple, easy-to-learn program. It lacks the analytic functions of spreadsheet and graphics packages, but it'll have you feeling like a computer whiz in no time, even without a manual. *—Wes Nihei*

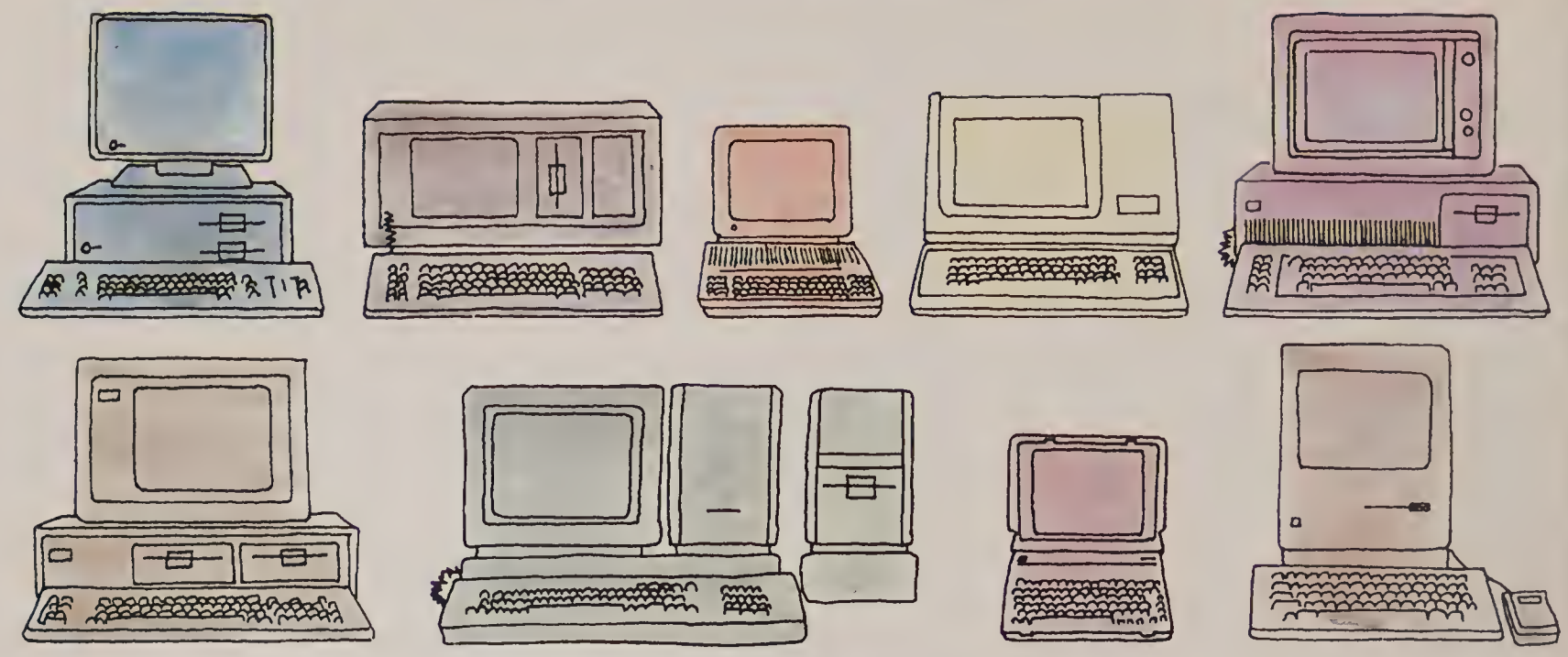
Offix
Emerging Technology Consultants, Inc.
2031 Broadway
Boulder, CO 80302
303/447-9495
List price: $149
Requirements: 192K, two disk drives
Copy protection: Yes

How About Dependability?

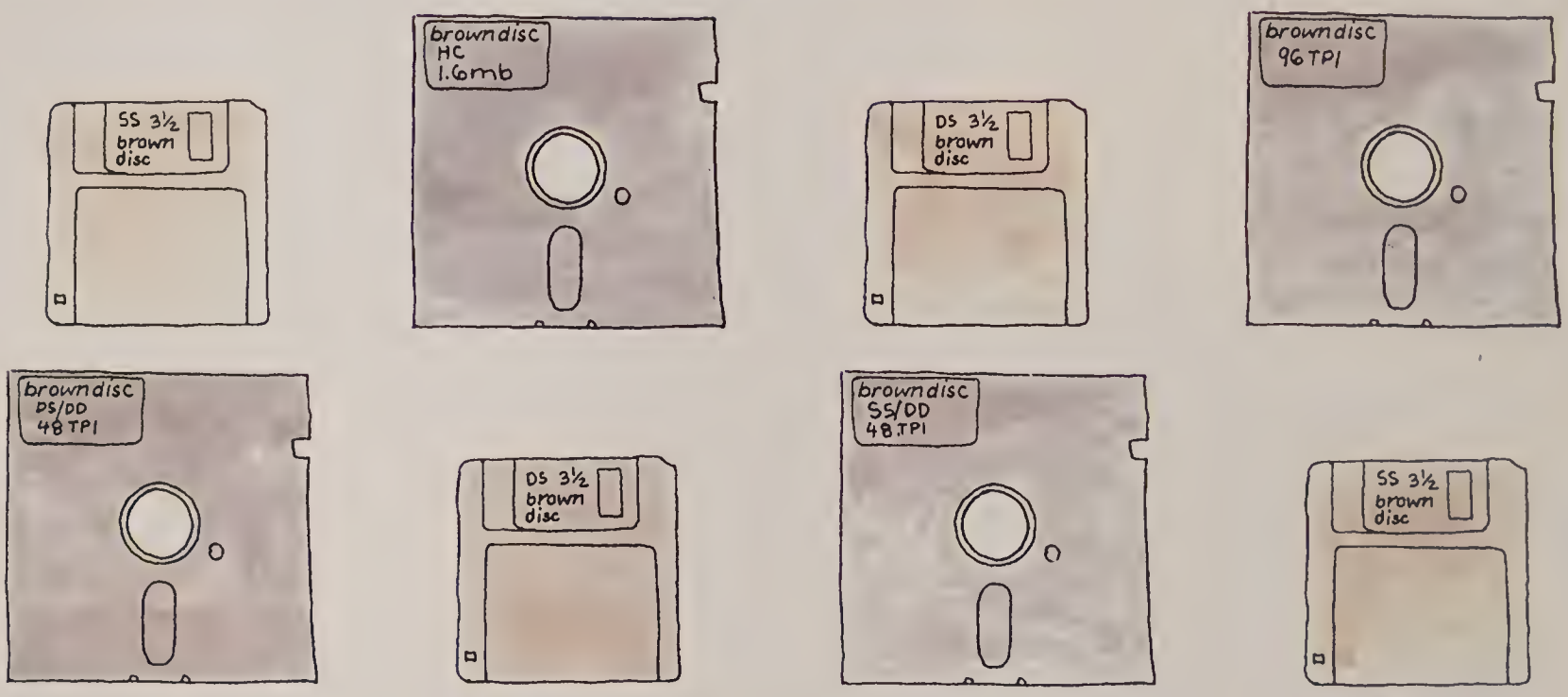
You rely on your personal computer system to help get your work done. That's why it's important to choose a monitor built for reliability. Princeton Graphic Systems monitors are built under the highest quality control standards, backed by a full one-year warranty and supported by a nationwide service network.* The result: monitors that perform when you need them, day in and day out . . .

*Bell & Howell, Xerox, MAI Sorbus Service and Princeton Graphic Systems.

HIGH PERFORMANCE PCs



REQUIRE



HIGH PERFORMANCE FLOPPIES

Brown Disc manufactures high performance media compatible with the new IBM AT™, Data General One™, and Apple Macintosh™ personal computers. In fact, our line of high-capacity 5¼" and 3½" Discs exceeds the manufacturer's specifications for these machines. Our 1.6 megabyte Disc is the new standard of performance in the floppy diskette industry and was developed long before the introduction of the IBM AT™.

Our complete line of flexible media is manufactured under the industry's strictest quality control standards and backed by a lifetime warranty. This consistent high performance guarantee represents real value no matter which model computer you use.

Maximize the potential of your system. Ask your dealer for the high performance floppies from Brown Disc or call John Boyd toll free at 1(800) 654-4871 for the Brown Disc dealer nearest you.

brown disc

1110 Chapel Hills Drive Colorado Springs, CO 80918 (303)593-1015 Telex 450827

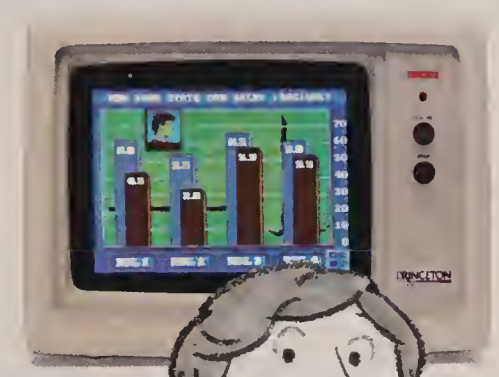
Circle 178 on reader service card

Meet The Princeton Graphics Systems Family.

The right monitor at the right price. Princeton Graphic Systems offers you a complete family of high performance personal computer monitors. Monitors that deliver the compatibility, resolution, and reliability you need for any application and any budget: from word processing to sophisticated business graphics.

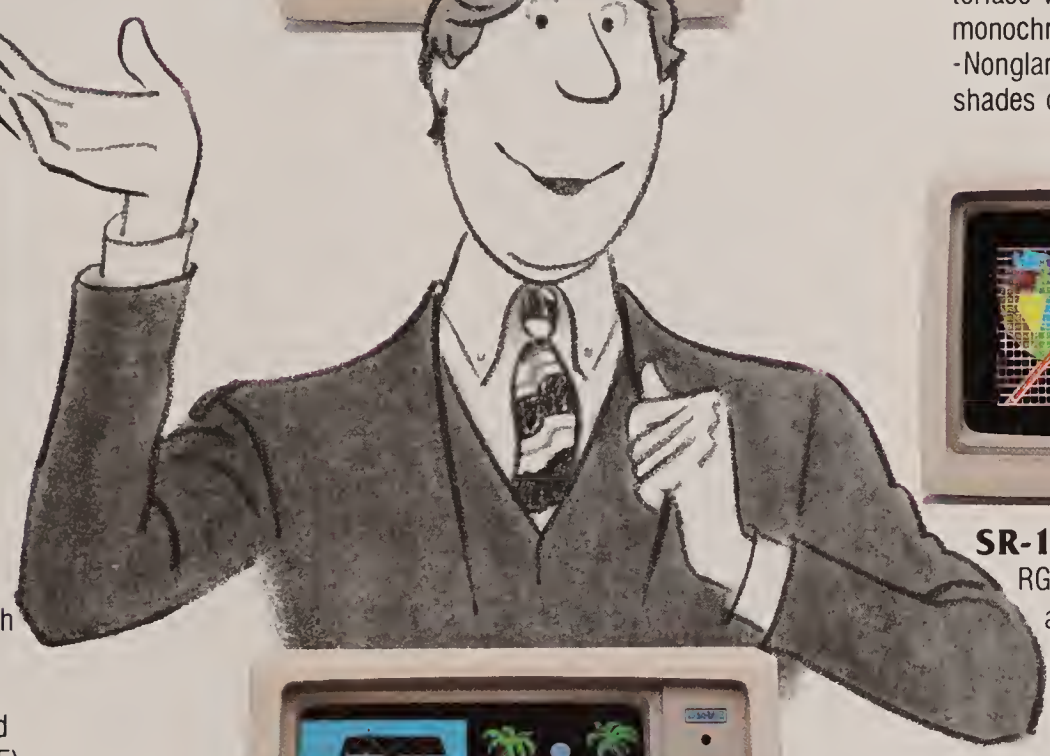
HX-12. High resolution RGB monitor -690 x 240 lines noninterlaced -.31 mm dot pitch tube-Nonglare screen -**$695**

HX-12E. High resolution RGB monitor -Compatible with IBM Enhanced Graphics Adapter -Nonglare screen -**$785**



MAX-12. Amber monochrome -720 x 350 lines -Enhanced to interface with IBM color or monochrome adapter card -Nonglare screen -Can display 16 shades of amber -**$249**

HX-9/9E. Nine inch, high resolution RGB monitor -.28mm dot pitch tube - 9E compatible with IBM Enhanced Graphics Adapter -Nonglare screen -Green/amber switch -Apple/IBM colors - Etched dark glass screen -**$650/$750** (9E)



SR-12P. PGS's top of the line RGB monitor - Analog input allows for the display of 4,096 possible colors - Compatible with IBM Professional Graphics Adapter - Nonglare screen -**$999**

SR-12. Super-high resolution RGB monitor -690 x 480 lines noninterlaced -.31 mm dot pitch tube - Nonglare screen - Requires interface card -**$799**

Princeton accessory product line.
Undergraduate tilt/swivel monitor base, ColorView card, Green/Amber switch, RGB-80 card and Scan Doubler card.

Princeton Graphic Systems. The only real choice.
For office or home use, Princeton Graphic Systems has a monitor that's right for you. Inquire at your local computer store about our complete line of high resolution color and monochrome monitors; monitors that live up to the Princeton Graphic Systems 'tradition of quality, performance, and value. **Princeton Graphic Systems.** 601 Ewing Street, Bldg. A, Princeton, N.J. 08540. (609) 683-1660 Telex: 821402PGSPRIN **(800) 221-1490.** Ext. 506

PRINCETON™
GRAPHIC SYSTEMS
AN INTELLIGENT SYSTEMS COMPANY

IBM IBM Enhanced Graphics Adapter and IBM Professional Graphics Adapter are trademarks of International Business Machines, Inc Compaq is a trademark of Compaq Computer Corp Corona is a trademark of Corona Data Systems, Inc Apple is a trademark of Apple Computer Corp PC World is a trademark of CW Communications Inc

Circle 296 on reader service card

A shelf loaded with software is impressive, but one simple program loaded with capabilities is better.

To get a lot out of your printer, you need a lot of programs, right? Wrong.

True, you want the power to change type sizes, create your own characters, and even print sideways. But you don't need a lot of printer utility programs like Sideways, Fancy Font and Facelift.

You don't need to pay for all that, either. One easy-to-use program called Printworks will blow all the others right off your shelf.

Printworks.™ It's loaded.

SoftStyle™

SoftStyle, Inc • 7192 Kalanianaole Hwy • Suite 205
Honolulu, Hawaii 96825 • Phone (800) 367-5600

$69.95. SoftStyle products are available at ComputerLand and other fine dealers.
Simple Menu Control • Pivot Printing ™ lets you print sideways quickly and easily • Prints full IBM character set including line graphics, math and science symbols • Foreign language characters • Easily set print modes: condensed, emphasized and more • Create new characters or entire fonts • Many fonts included • Supports thousands of popular software packages including Wordstar, dBaseII and Lotus 1-2-3.
Printworks enhances over 30 dot-matrix printers: C.ITOH Prowriter (8510, 1550, 7500 all with the letter "E" included in the model number), CENTRONICS Horizon (H80, H136), EPSON (FX-80/100, RX-80/100, JX-80, LQ-1500, MX-80/100 III with Graftrax Plus), IBM Graphics Printer, INFORUNNER Riteman (Plus, Blue Plus, II, 15), NECPinwriter (P2-3, P3-3), OKIDATA (ML 84 Step 2, ML 92 and 93 with or without Plug 'n Play Kit, Pacemark 2350 and 2410), and STAR (Gemini 10X/15X, Radix 10/15, Delta 10/15). For the IBM PC, PC-AT, PC-XT, PCjr., Compaq and many other IBM compatibles. Needs 128K and DOS 1.1 or later
Sideways is a trademark of Funk Software, Inc. Fancy Font is a trademark of SoftCraft. Facelift is a trademark of Companion Software, Inc.

Circle 816 on reader service card

Statewide, the full service Hard Disk Distribution Center

It's only logical to do-it-yourself and save

10 to 80 MB HARD DISK SYSTEMS

totally designed with the IBM PC in mind

- Volume leasing program
- Technical support team
- 1 Yr. warranty on drives
- Service contracts available
- Multi line distribution
- Technical Hot Line

While Supply Lasts

$499

LIST PRICE ~~$899~~

10 MB HARD DISK KIT

While Supply Lasts

$765

LIST PRICE ~~$1199~~

20 MB HARD DISK KIT

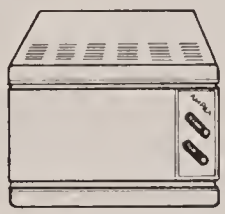
INTERNAL KITS

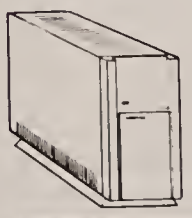
	LIST	
10 MB H/H Cogito	~~895~~	Call
Microscience	~~895~~	Call
Fujitsu	~~895~~	Call
10 MB F/H Fujitsu	~~895~~	Call
20 MB H/H Hard Disk		
Cogito	~~1295~~	Call
Microscience	~~1295~~	Call
Miniscribe	~~1295~~	Call
Mitsubishi	~~1295~~	Call
Seagate	~~1295~~	Call
20 MB F/H Ampex	~~1195~~	Call
Fujitsu	~~1195~~	Call
24 MB 30 MS Drive	~~2195~~	Call
45 MB 30 MS Drive	~~2395~~	Call
67 MB 30 MS Drive	~~2795~~	Call
10 MB Removable DMA	~~1695~~	Call

EXTERNAL

Ampex

- 20 MB HD ~~1695~~ Call
- 10 MB HD & 20 MB Tape Call





DATAMAC List

- 10 MB Truster 10 ~~1450~~ Call
- 30 MB Truster 30 ~~2495~~ Call

MONITORS

Amdek	From	147
Taxan	From	153
Princeton	From	191
Ampex	From	549

DESIGN YOUR OWN IBM™ PC

STORAGE

- 10/20 MB HARD DISKS
- 10 MB REMOVABLE CARTRIDGE
- 356K FLOPPIES
- 45/60MB TAPE BACK-UP

POWER AND SPEED

- PC TURBO
- BLOSSOM
- PC NET
- RAM MEMORY

ORCHID TECHNOLOGY

- BLOSSOM
- PC net BLOSSOM
- PC net PLUS RAM
- PC net
- PC TURBO

PC TURBO

FLOPPY DRIVES

Teac	~~165~~	Call
Mitsubishi	~~185~~	Call

1-800-882-8311 1-800-553-7800 312-932-0890

It's Statewide for all the PC storage solutions

AMERICAN EXPRESS VISA MasterCard

NO CHARGE FOR CREDIT CARD USE

IBM is a trademark of IBM Corp

STATEWIDE

MICROELECTRONICS, INCORPORATED

10 East 22nd Street, Lombard, IL 60148

Price includes UPS surface freight and insurance. Extra for two day air service. For fastest delivery send certified check or Credit Card. Personal checks take 18 days to clear. IL residents add 7% sales tax. Corporations & institutions call for purchase order details. Returns must be accompanied by RMA # or subject to 20% restocking fee.

Circle 185 on reader service card

Company Offers FREE OVERNIGHT DELIVERY!!!

New customer service policy expected to set a new standard in the mail order industry!

BY MICHAEL CHRISTOPHER

GARDEN CITY, N.Y.—Mr. David W. Pasternack, President of Logicsoft, a major IBM PC software and hardware distributor, has announced the inception of a unique new customer service policy. . . .free overnight courier delivery on their entire product line.

In a recent interview, Mr. Pasternack stated that "We feel our new free overnight delivery service will set a new standard in the computer software mail order industry. In a study we conducted, we found that in addition to competitive pricing, expedience was a factor utmost in our customer's minds. Whether their order was $300 or $3000, the need to get their package as soon as possible was the same. Under our old procedures, between processing and shipping time, it could take up to a week and a half to two weeks for an order to arrive. With our new courier service, an order can be processed, shipped,and arrive in our customer's hands in only 3 working days. . .at no additional charge!"

The company is using Emery Worldwide to handle the large number of packages being shipped each evening for next day delivery. "We chose Emery for their competitive pricing structure and excellent delivery record", said Mr. Pasternack. Emery was quoted as saying, "This makes Logicsoft the largest single Emery account in the New York Metro area.

LOGICTIP OF THE MONTH

Choosing software can be mind-boggling. With the proliferation of publishers, how do you choose. Analyze your needs. . . what specific tasks do you want to perform. Read the software reviews; an excellent way to evaluate a package. Ask around. . . you'd be surprised how many associates may be using a package similar to your application. Finally, choose the best package (not always the most expensive). Upgrading will end up costing you more. Remember the key word is research.

Logicsoft's Lowest Price Guarantee Still Effective

GARDEN CITY, N.Y.—Logicsoft, Inc. has indicated that their long time policy of guaranteeing the lowest prices in the mail order market is still being offered and will not be affected by their new free overnight delivery service. "We will continue to beat any price by $10" a company spokesman said. "We'd be crazy to fool with success", he stated; "since the inception of our lowest price guarantee, sales have skyrocketed."

When asked how Logicsoft could afford to give their customers free overnight delivery plus beat any price by $10, they replied "Buying Power". "Very simply", they said, we buy at the best possible prices and pass those savings along to our customers".

CONTINUOUS STATIONERY: BIG BUSINESS, But "Where's The Class?"

NEW YORK—The growth of Logicforms, Inc., a member of the Logic Group, has been phenominal. Mr. Ralph Corso, President of Logicforms explains why. "Up until now, buying continuous stationery through the mail has been a take what's available situation". "First off", he said, "almost all mail order firms offer only stock letterheads & envelopes with limited typestyles, colors and stock logos from which to choose, but, 'where's the class'?"

"The individual style and design of a letterhead", said Mr. Corso, "reflects the professionalism and personality of a company and should not have to change because they now have a printer and the need for continuous stationery. While other mail order firms are limited in the variety they can offer, Logicforms *specializes* in custom stationery. Logicforms offers a large selection of quality paper, ink colors and special effects such as thermography, blind embossing, foil stamping and multi-color printing." Mr. Corso went on to say that "whether a customer chooses to supply his own artwork or printed letterhead, *or* wishes to select from our vast array of stock designs. . .We are the Logical Choice".

For a free sample/pricing kit and a handy re-usable shipping envelope for artwork, simply call toll-free 1-800-645-3491 or send a sample of your current stationery for a free firm price quote. Mail to Logicforms, Inc., 300 Garden City Plaza, Garden City, N.Y.11530

TOLL-FREE SUPPORT A Smashing Success

GARDEN CITY, N.Y.—A survey of Logicsoft's toll-free technical support policy was done to see if it warranted the continued costs of the 800 toll-free number, personnel costs, etc. After careful monitoring of these calls (both pre-sale and after sale) it was found that 92% of the calls were for legitimate technical support questions rather than for answers already contained in the softwares' operations manual. As a result of the survey, the decision has been made to continue toll-free support as an important part of their customer service.

This service consists of assisting with: • Hardware requirements • Initial boot-up procedures • Initial software configuration (printers, disc drive, etc.) • Back-up procedures • Defective program determination • Alternative program recommendation • Return policy

Circle 995 on reader service card

TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

LOGICSOFT®

LOWEST PRICE GUARANTEE

WE WILL *BEAT* ANY PRICE BY

$10

Tell us the advertiser and price of any software or hardware item on this card currently advertised in any popular computer publication and we'll beat that price by $10. This offer does not apply to items under $100 or where the price is not lower than Logicsoft's.

BETTER BUSINESS BUREAU BBB MEMBER

MEMBER Direct Marketing Association Inc dma

PLUS...FREE OVERNIGHT DELIVERY *VIA* Purolator courier

Fast Delivery...it's our way of saying *THANK YOU* to our many valued customers. It's because of *you* that our tremendous buying power has enabled us to pass these savings along in the form of *FREE OVERNIGHT DELIVERY*...A special service *only* available through LOGICSOFT ..."The Logical Choice" for all your software and hardware requirements.

SOFTWARE

Immediate Replacement on any Defective Product!

WORD PROCESSING

Wordstar 2000 ..... Lowest Price
Wordstar Pro Pac $275
Wordperfect $295
Microsoft Word with Mouse $289
Multimate $269
Peachtext 5000 ..... $195
Volkswriter Deluxe $169
Easywriter II/Speller/Mailer $195
Edix & Wordix $255
Finalword $225
Samna Word III $319
XyWrite II Plus $259
Think Tank $139
Wordplus (Oasis) $115

DATA BASE MANAGEMENT

Knowledgeman $275
TIM IV $269
R:Base 4000 ..... $295
dBASE III $369
dBASE II $295
Quickcode III $179
Condor III $325
Data Base Manager II (Alpha) $195
Infostar Plus $295
Friday $169
pfs:file & pfs report $165
Revelation $759
Powerbase $265
Personal Pearl $229

WE'RE FRESH!
WE SHIP ONLY THE LATEST VERSIONS AVAILABLE
THATS OUR CURRENT VERSION GUARANTEE!

INTEGRATED/SPREADSHEETS

Enable $549
Smart Software ..... Lowest Price
Aura $299
Open Access $385
Electric Desk $219
Framework $369
Symphony $429
Lotus 1-2-3 ..... $309
Corporate MBA $509
Supercalc 3 ..... $195
Multiplan $135
TK! Solver $269

GRAPHICS

BPS Graphics $289
Fast Graphs $199
Chartmaster $279
Signmaster $195
pfs:graph ..... $ 85
Graphwriter Combo Pak $475
Energraphics $269
PC Draw $295
Chart (Microsoft) $179

FINANCIAL/SCHEDULERS

Managing Your Money (Tobias) $159
Financier II $115
Dollars & Sense $115
Market Manager (Dow Jones) $229
Market Analyzer (Dow Jones) $269
Market Microscope (Dow Jones) $259
PCPFP II (Best) $169
Microsoft Project $175
SuperProject $275
Harvard Project Manager $319
Project Scheduler (Scitor) $195

LANGUAGES/UTILITIES

Concurrent CP/M86 w/Windows (DR) $225
Pascal MT + (DR) $235
PL/1 (DR) $479
Display Manager (DR) $359
Access Manager $269
Lattice C Compiler (Lifeboat) $299
CIS Cobol 86 (DR) $479
Pascal Compiler (MS) $245
C Compiler (MS) $325
Microsoft Sort $159
Cobol Compiler (MS) $495
Business Basic (MS) $369
Fortran Compiler (MS) $245
Prokey 3.0 ..... $ 89
Norton Utilities (New Release) ..... $ 65
C-Food Smorgasbord $119
Crosstalk XVI $105

SEE REVERSE SIDE FOR... • HARDWARE • ACCOUNTING • P.C.JR. • AND MORE!

Prices subject to change without notice.

OVER 400 ADDITIONAL TITLES IN STOCK!

★ NO SURCHARGE for VISA or MasterCard ★ Purchase Orders Welcomed from Qualified Institutions...NO SURCHARGE! ★ No Sales Tax on Orders Outside N.Y. State ★ Please add 2% for handling and insurance (Int'l orders add'l.) ★ Payment: MasterCard, VISA, American Exp., C.O.D., Money Order or Check

MasterCard VISA AMERICAN EXPRESS

1-800-645-3491

New York State . . 516-741-0043 Canada . . . . . 416-283-2354 Domestic/International Telex . . . . . 286905 Soft UR

LOGICSOFT®
THE LOGICAL CHOICE
A Member of the Logic Group
110 Bi-County Blvd. Farmingdale N.Y. 11735

ACCOUNTING SYSTEMS

	Information Unlimited (IUS)	Open Systems	Great Plains	Peachtree Series 8	State of The Art	Realworld (MBSI)	BPI
Accounts Payable	$295	$399	$579	$375	$479	$575	$395
Accounts Receivable	$295	$399	$579	$375	$479	$575	$395
Fixed Assets	—	$399	—	—	—	—	—
General Ledger	$295	$399	$579	$375	$479	$575	$395
Inventory	$295	$399	$579	$375	$479	—	$529
Job Costing	—	$399	—	$375	—	—	$529
Material Management	—	$399	—	—	—	—	—
Order Entry	$295	—	—	—	—	—	—
Order Entry/Inv.	—	—	—	—	—	$575	—
Payroll	$359	$399	$579	$375	$479	$575	$395
Purchase Order Processing	—	$399	—	—	—	—	—
Report Writer	—	$399	—	—	—	—	—
Sales Invoicing	—	—	—	$375	$479	—	—
Sales Order Processing	—	$399	—	—	—	—	—
Time Keeping/Billing	—	—	—	—	$679	—	—

TCS Client Ledger System $1195

JUST A PARTIAL LISTING OF ACCOUNTING SYSTEMS · CALL TODAY!

CONFUSED OVER ACCOUNTING SYSTEMS?

We don't blame you, that's why we invite you to give us a call.

We've evaluated over 50 of them and just because you can save a lot of money buying mail order shouldn't mean you have to sacrifice service... We want to take the time to assist you before you buy. We realize that an accounting system can add up to a sizeable investment, and helping you end up with the right package for your money is what doing business is all about

WE WILL BEAT ANY PRICE BY **$10**

See Other Side for Details

NEW! Expanded Special Order Dept.

If you can't find what you need call and ask for **Our Special Order Dept...**We've got the suppliers!

PC JUNIOR! New Items Daily...Call!

Lotus 123 . . . . $309 Jr. Capt. Board $345

FREE Overnight Delivery

See Other Side for Details

HARDWARE

PRINTERS*

DIABLO
36 . . . . . $1099
620 749
630-API 1529
630-ECS 1779

EPSON
LQ1500 . . . . . $1199
Parallel Interface . . Lowest Price
JX80 599
RX80 239
RX80 F/T 289
RX100 399
FX80 379
FX100 599

C. ITOH
Prowriter 8510 P . . . . . $ 329
Starwriter A10P 479
Starwriter F10-40P 969
Printmaster F10-55P 1249

JUKI
6100 . . . . . $439
6300 749

MANNESMANN TALLY
Spirit $279
160 579
180 769

NEC
2030 . . . . . $ 719
8027 349
2050 695
3530 1329
3550 1395
7730 1699
8850 1785
Pinwriter P2 675
Pinwriter P3 895

OKIDATA
82A . . . . . $ 319
83A 589
84 1095
92 389
93 639

PRINTERS*

OKIDATA (cont.)
2350P $2095
2410P 2295

QUADRAM
Quadjet $789

QUME
Sprint 11/45 . . . . . $1299
Sprint 11/55 1595
Sprint 11/90 . . . . . Lowest Price

SILVER REED
400 . . . . . $279
500 349
550 449
770 795

TOSHIBA
1351 Tractor . . . . . $ 159
1351 1299
1340 779

CITIZEN . . . . . Lowest Price

PRINTER/PLOTTERS*

HEWLETT PACKARD
HP-7470A . . . . . $ 945
HP-7475 1595

MONITORS*

AMDEK
Color 300 . . . . . $255
Color 500 389
Color 600 479
Color 700 579
12" Green 300G 135
12" Amber 300A 145
12" Amber 310A 169
13" Color IV 685

NEC
JB1201 . . . . . $159
JB1205 149
JC1215 239
JC1216 399

PRINCETON GRAPHICS
RGB HX-12 . . . . . $489
RGB SR-12 599
Scan Doubler Board (for SR 12) 185

MONITORS*

PRINCETON GRAPHICS (cont.)
Amber Max-12 . . . . . $185

QUADRAM
Quadchrome 12" . . . . . $ 465
Quadscreen 17" 1595
Quadchrome II 14" 465
Amberchrome 12" 165

TAXAN
100G $125
105A 135
121 149
122 149
210 249
420 409
440 699

BOARDS

AST RESEARCH
AST-5251 . . . . . $699
AST-SNA 699
AST-BSC 699
AST-3870 749
Six Pak Plus 64K 265
MegaPlus II 64K 265
I/O Plus II 125
Monograph Plus 425

DCA
IRMA Board $989

HERCULES
Graphics Card $335
Color Card 175

IDEA
IDEAmax 384 . . . . . $259
IDEAplus . . . . . Lowest Price

KENSINGTON MICROWARE
MasterPiece $115

MA SYSTEMS
Peacock Color Board $245

MOUSE SYSTEMS
PC Mouse $145

PARADISE SYSTEMS
Multi Display Card $285
Modular Graphics Card . Lowest Price

BOARDS

MYLEX
Chairman $495

ORCHID
Blossom, 64K $235

PERSYST
Monochrome Card $199

PLANTRONICS/FREDERICK
Colorplus $375

QUADRAM
Quadboard 64K $265
Quadlink 449
Quadcolor I 195
Quadcolor II 465

STB
Super Rio $499
Rio Plus II 249
Graphics Master 545
Graphics Plus II 345

TECMAR
Captain $265
Graphics Master 475

MODEMS

HAYES
Smartmodem 300 . . . . . $199
Smartmodem 1200 485
Smartmodem 1200B (with Smartcom II) . 399
Cable (IBM) 25

NOVATION
Smart-Cat 103/212 . . . . . $439
Smart-Cat 103 185
Smart-Cat Plus 355

QUADRAM
Quadmodem (internal) $570
Quadmodem (external) 625

US ROBOTICS
Auto-Dial 300/1200 . . . . . $455
S-100 Modem 345

KEYBOARDS

KEY TRONIC
Typewriter Keyboard (5150) $159
Deluxe Keyboard (5151) . . . 169

MEMORY CHIPS

(200ns) 64K $45

*Due to weight Restrictions Printers and Monitors are shipped UPS. . .FREE!

LOGICSOFT can assist you in these major areas with Toll-Free Support!
• Hardware requirements • Initial boot-up procedures • Initial software configuration (printers, disk drive, etc.) • Back-up procedures • Defective program determination • Alternative program recommendations • Software return policy.

MasterCard VISA AMERICAN EXPRESS

1-800-645-3491

New York State . . 516-741-0043 Canada . . . . . 416-283-2354 Domestic/International Telex . . . . . 286905 Soft UR

LOGICSOFT®

THE LOGICAL CHOICE
A Member of the Logic Group

110 Bi-County Blvd. Farmingdale N.Y. 11735

TEAR AND COMPARE! TEAR AND COMPARE! TEAR AND COMPARE!

MICROWAY'S 8087 RUNS 1-2-3™!

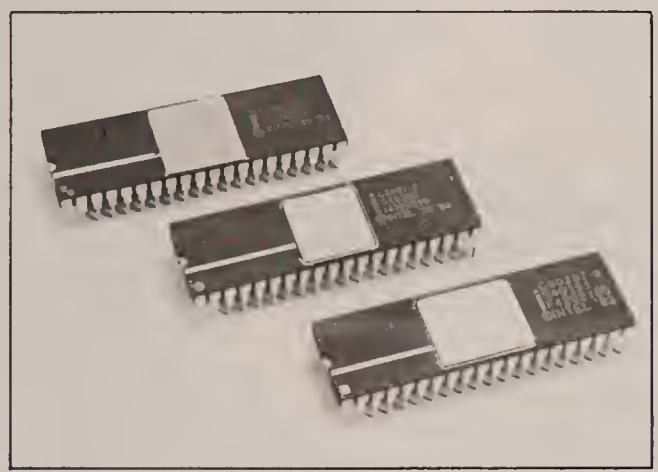
MicroWay is the world's leading retailer of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business – 180 days! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 in the PC AT. Our new NUMBER SMASHER™ includes 512K ram. It will run the IBM PC at clock speeds up to 9.5mhz and achieves a throughput of .1 megaflops with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. For information call us at

617-746-7341

FASTBREAK™

MicroWay's daughterboard turns on your 8087 during 1-2-3™ execution and extends DOS functionality. Recalculations run up to 33 times faster. Includes an 8087 chip. When used with the NUMBER SMASHER™ it can provide a total increase in 1-2-3™ execution speed of up to 80 to 1.

FASTBREAK™ 5mhz..... **$339**
FASTBREAK™ 8mhz..... **$479**
FASTBREAK™ for NUMBER SMASHER..... **$239**
FASTBREAK™ BOX Option **$60**



Micro Way™ 8087 Support

For the IBM PC, PC XT, PC AT and Compatibles.

87FFT™ performs Forward and Inverse FFTs on real and complex arrays which occupy up to 512K bytes of RAM. Also does convolutions, auto correlations, hamming, complex vector multiplication, and complex to radial conversions. Callable from MS Fortran or 87BASIC/INLINE..... **$150**

87FFT-2™ performs two-dimensional FFTs. Ideal for image processing. Requires 87FFT...**$75**

MATRIXPAK™ manages a **MEGABYTE!** Written in assembly language, our runtime package accurately manipulates large matrices at very fast speeds. Includes matrix inversion and the solution of simultaneous linear equations. Callable from MS Fortran 3.2, 87MACRO, 87BASIC/INLINE, and RTOS ..... each **$150**

GRAPHICS PACKAGES

Energraphics (stand alone)..... **295**
Grafmatic for MS Fortran or Pascal **125**
Plotmatic for Grafmatic..... **125**
Halo for Basic, C or Fortran..... each **150**

OTHER TOOLS

Alpha Software ESP..... **500**
Borland Sidekick, Toolbox, or Graphics..... **35**
SuperKey..... **70**
COSMOS Revelation..... **850**
smARTWORK..... **895**
SPSS/PC..... **695**

MAYNSTREAM..... **1695**

DFixer
A disk utility which thoroughly checks PC or AT hard disks for bad sectors and updates the MS DOS file allocation table accordingly.....**$149**

87DEBUG™ - a professional debugger with 8087 support, a sophisticated screen-oriented macro command processor, and trace features which include the ability to skip tracing through branches to calls and software and hardware interrupts. Breakpoints can be set in code or on guarded addresses in RAM..... **$150**

HARDSCOPE™ includes a version of 87DEBUG which interfaces a Breaker Box which makes it possible to reset your PC and break program execution independent of DOS... **249**

87BASIC/INLINE™ converts the output of the IBM Basic Compiler into optimized 8087 inline code which executes up to seven times faster than 87BASIC. Supports separately compiled inline subroutines which are located in their own segments and can contain up to 64K bytes of code. This allows programs greater than 128K! Requires the IBM Basic Compiler and Macro Assembler. Includes 87BASIC **$200**

87BASIC™ includes patches to the IBM Basic Compiler and both runtime libraries for USER TRANSPARENT 8087 support. Provides super fast performance for all numeric operations including trigonometrics, transcendentals, addition, subtraction, multiplication, and division.... **$150**

87MACRO™ - our complete 8087 software development package. It contains a "Preprocessor," source code for a set of 8087 macros, and an object library of numeric functions including transcendentals, trigonometrics, hyperbolics, encoding, decoding and conversions. For the IBM Macro Assembler, Version 1.0 or 2.0..... **$150**

OBJ→ASM™ - a multipass object module translator and disassembler. Produces assembly language listings which include public symbols, external symbols, and labels commented with cross references. Ideal for understanding and patching object modules and libraries for which source is not available **$200**

RTOS - REAL TIME OPERATING SYSTEM
RTOS is a multi-user, multi-tasking real time operating system. It includes a configured version of Intel's iRMX-86, LINK-86, LOC-86, LIB-86, OH-86, and MicroWay's 87DEBUG. Runs on the IBM-PC, XT, PC-AT and COMPAQ..... **$400**

INTEL COMPILERS[1]

FORTRAN-86..... **750**
PASCAL-86..... **750**
PL/M-86..... **500**
87C (LATTICE/MICROWAY)..... **750**
ASM-86..... **200**

[1]Requires RTOS or iRMX-86. All Intel compiler names and iRMX-86 TM Intel Corp.

HARDWARE AND LANGUAGES

8087 5mhz **$129**
Including DIAGNOSTICS and 180-day warranty For IBM PC and compatibles.

8087-2 8mhz..... **$275**
For Wang, AT&T, DeskPro, NEC, Leading Edge

80287-3 5mhz.... **$275**
For the IBM PC AT

64K RAM Set..... **$15**
256K RAM Set..... **$89**
128K RAM Set PC AT... **$169**
NUMBER SMASHER™... **1590**
9.5mhz 8087 coprocessor board with 512K

FORTRAN and UTILITIES

Microsoft Fortran 3.2 ..... **229**
IBM Professional Fortran..... **545**
Intel Fortran-86[1]..... **750**
FORLIB+ **65**
STRINGS and THINGS **65**

C and UTILITIES

Lattice C..... **299**
Microsoft C V 3.0 ..... **CALL**
C86..... **299**
C TOOLS **85**
C Trigs and Trans..... **150**

BASIC and UTILITIES

IBM Basic Compiler..... **270**
87BASIC/INLINE..... **200**
Summit BetterBASIC™..... **175**
Summit 8087 Module..... **87**

MACRO ASSEMBLERS

IBM Assembler with Librarian **155**
87MACRO..... **150**
Microsoft Assembler V 3.0..... **125**

PASCAL

Microsoft Pascal 3.2..... **199**
Borland Turbo Pascal..... **45**
Turbo with 8087 Support **85**

APL

STSC APL★PLUS/PC..... **475**
Pocket APL **85**

FASTBREAK and NUMBER SMASHER are trademarks of MicroWay, Inc. Lotus and 1-2-3 are trademarks of Lotus Development Corporation.

Micro Way P.O. Box 79 Kingston, Mass. 02364 USA (617) 746-7341

You Can Talk To Us!

Circle 118 on reader service card

Finally, the printer for all PC needs.

The TI 855 printer. The printer for all major PC's. See for yourself today. Call 1-800-527-3500 for the dealer nearest you.

TEXAS INSTRUMENTS

Creating useful products and services for you.

© 1984 TI

This printout was not generated by the TI 855.

DPF 00000
2764-08

One option you can't do without.

When your system or peripherals go silent, your TRW Service Agreement goes to work. Which, very simply, makes TRW the one computer option you can't do without. Especially when the price of silence involves more than just time.

A TRW Service Agreement is a quality product. It represents a nationwide network of technical professionals, ready to respond quickly to high tech's low moments. TRW gets the job done. On mainframes. Minis. Single-user PCs. Multi-user networks.

And not just IBM. TRW also repairs Altos, TeleVideo, NEC, DEC, Wyse, Dataproducts, Esprit, Rexon, Datasouth, Okidata and much more. Over 50 brands in all. TRW Service Agreements give you the service expertise your system needs in a pinch. At your business location or at one of our many service centers.

Since quality maintenance and repair is our principal business, TRW's main concern is to get your hardware up and running fast, so your business can return to high productivity before the silence becomes deafening.

Discover the benefits of the TRW Service Agreement. Call 1-800-257-7464 for the address and number of the TRW Customer Service Center nearest you.

The TRW Service Agreement. The one option that will sound great when all is silent.

CLIP AND SEND!

Write for your FREE booklet on PC care, "TIPS from TRW."

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

TRW Customer Service
Dept. 845, 15 Law Dr., Fairfield, N.J. 07006 PW5-85

TRW

Nationwide Service From A Company Called TRW

©TRW Inc., 1985 TRW is the name and mark of TRW Inc.

Circle 959 on reader service card

IBM is a trademark of International Business Machines Corporation

Tapping Into On-Line Data Bases

On-line data bases are crammed with information on everything from corporate finances to psychological research. With the help of a PC, you can turn this mass of data into useful knowledge.

Chris Yalonis and Anthony Padgett

Mark Carlton, an attorney for Mobil Oil in Chicago, is faced with a tricky legal problem that must be solved in a few short hours. Instead of going to a law library and spending precious time paging through casebooks, statutes, and law reviews, he sits down at his PC, dials into a full text legal data base, and within minutes has located most, if not all, of the relevant cases and commentaries. With a few additional searches he finds where the cases have been cited, searches federal statutes, and examines the complete texts of relevant law review articles going back many years. He then prints several full articles and parts of others and scans them, pen in hand. Within a short time, without leaving his desk, Mark has tapped into a larger body of legal knowledge than is contained in even the largest law libraries.

Nick Tarlson, vice president of finance for Brae Electric in San Francisco, has just received a call from the president of a large energy production company, who has proposed a merger of the two companies. "I'd like your decision as soon as possible on whether we should proceed with discussions," the president says. Nick hangs up and turns on his PC. He loads an integrated communications/spreadsheet package and dials Disclosure II, an on-line data base filled with detailed financial information on thousands of companies. Within minutes he finds the data he needs on the potential partner and downloads it into a spreadsheet. By the end of the morning, Nick has analyzed the company's financial reports and has determined that the other company has several weaknesses. "Based on your financial condition, your offering price is much too low," he tells the company president later that same day. Both parties know Nick is right. He has done his homework, and his company has the negotiating edge.

These are just two examples of the often amazing potential of on-line services to regulate the flow of timely information. Tapping into a data base via personal computer to search for information is like being

able to tour the myriad stacks of the immense New York Public Library without leaving home or office. What's more, you can find the information you need in a fraction of the time that it would take to perform manual research.

Currently, more than 3000 data bases contain information on almost every subject imaginable. They are available through over 300 on-line services, most carrying just a few data bases and others, such as Dialog Information Service or Dow Jones News/Retrieval, offering up to 200 separate data bases.

Most data bases offer abstracts only—short bibliographic entries with summaries of the articles. Often, the data base or service allows you to order the full text of an article on line, but delivery takes several days. Increasingly, however, full text data bases are appearing, especially in news data bases, so you can download the full text of an article directly. The major full text services are Nexis, Lexis, and NewsNet. The other large services have some full text data bases, but the vast majority are bibliographic.

Full text data bases provide the major benefit of instant gratification, but since most don't provide a subject index, a search can go out of focus.

Both methods have their pros and cons. Full text data bases provide the major benefit of instant gratification, but since most don't provide a subject index, you can search only by keywords in the text. If the documents are lengthy, this limitation can cause a search to go out of focus. The longer a document, the greater the chance that your keyword search will yield irrelevant documents that only mention your subject in passing. Furthermore, full text usually takes longer to download or print, which adds to connect costs.

Because each entry is shorter, bibliographic data bases usually provide more sources, and a well-written abstract can often answer your questions, so you won't have to order the full text. Yet some abstracts can be misleading, and delays caused by waiting for text to arrive in the mail are frustrating if you need the information right away.

Once you subscribe to one or more on-line services and receive your password in the mail, you are ready to enter the wondrous (and expensive) world of electronic research. The volume of information available in on-line data bases can be overwhelming, and just as the first-time library user has to be shown the ropes, the novice electronic librarian should make some preparations before running up a steep on-line bill. The following steps should help.

Determine Your Needs

Because there are so many kinds of data bases, each varying in subject matter, cost per hour, detail, and ease of use, you must determine your information requirements carefully. What information do you need quickly and regularly? What expense in time and money do you incur in obtaining this information? Does your work require access to a large number of magazines, newspapers, or journals?

If you are like most professionals, you probably spend too much money on subscriptions to magazines and newsletters that you barely skim. While some business data bases can cost as much as $50 to $75 per hour, with the right data base and efficient searching tips, on-line searching usually costs less than the combined expenses of research assistant salaries, magazine subscriptions, and in-house libraries. And if speed of retrieval is a priority, electronic research is the way to go.

Shop for the Right Data Bases

Finding appropriate services and data bases is not easy. See the list of the major services and directories at the end of the article. If you want more information, call the data base producer or the on-line service vendor.

When calculating costs versus benefits, keep in mind that many on-line services provide more than just informational data bases. On some you can also bank, shop, make airline reservations, buy and sell stocks, check the latest sports news, or chat with colleagues on electronic bulletin board systems (BBSs). Using such consumer services is much cheaper than

logging on to professional data bases. "Supermarket vendors" such as CompuServe and The Source, which contain data bases on consumer and professional topics, are the best way to start.

In making your decision you should also be aware of the services available at night. After-hours services such as Dialog's Knowledge Index and Bibliographic Retrieval Service's BRS After Dark are dramatically less expensive than the companies' daytime services. In addition, searching at night is often faster because of reduced demand on the services' computers.

Choose the Right Software

While just about any microcomputer modem will work with on-line data bases, choosing the best software is critical for getting the most out of going on line. In some cases, you may want to postpone buying communications software until you know which data base you want to tap—some services provide custom software free with the price of a subscription. Communications software for accessing on-line services can be roughly divided into four categories: multipurpose communications software, customized data base software, gateway interface software, and integrated communications/application software.

Multipurpose communications software. Basic communications packages, such as *Smartcom II, PC-Talk III,* and *Crosstalk XVI,* have a wide variety of functions for communication with other PCs or on-line services. Such programs are not geared to any one data base and do not provide a customized user-friendly interface for data base query languages. They simply allow you to dial the data base, log on, download (receive) data to the printer or disk, upload (send) data from a disk file for electronic mail, and log off.

Customized data base software. Many data base vendors provide customized software designed for their own data bases. This software may feature simplified or automatic logon or a menu-driven front end for easier access to information. The Source and Dow Jones both offer this type of software.

Gateway interface software. This software is an offshoot of the previous category, but it goes several steps further. These programs may have an English-like interface to the data base, or the capacity to build the segments of a search while off line and send a query in one shot, minimizing time spent on line. Examples of gateway software are Menlo Corporation's *In-Search* (see "Gateways to On-Line Services" in this issue), which works with Dialog data bases, and Texas Instrument's *NaturalLink,* for Dow Jones News/Retrieval.

Integrated communications/application software. This software allows data or text to be downloaded from a data base directly into a spreadsheet package, a data base management system, or another application program, thus eliminating the time-consuming task of saving or printing the data first and then re-inputting or converting it into a form usable by a stand-alone application program. Examples of this type of software include VisiCorp's *VisiLink,* which works with Data Resources data bases, and Dow Jones's *Spreadsheet Link,* which works with the Dow Jones data bases.

Experimentation and Training

Most on-line services ask for a subscription fee, for which you usually receive a password and a manual. Most manuals could double as tugboat anchors, but they are worth the effort of reading. Once you get your password and you've looked through the manual, it is time to start experimenting.

If you intend to spend a lot of time on line, see if the data base vendor offers classes. It won't take long for the classes to pay for themselves. Many data bases provide a free hour or half hour of search time.

When you first log on to a data base, call at night when rates are lower. Plan your search strategy in advance, and write out a list of search commands and phrases that can be sent in a batch to cut down on on-line time. (See "On-Line Search Strategies" in this issue for a hands-on look at planning a search strategy.)

Vertical Data Bases

Before the spread of microcomputers, on-line searching was almost completely the province of professionals. Although many on-line services now offer consumer-oriented data bases, vertical market data bases still predominate. In the fields of finance, economics, law, medicine, and engineering, electronic research is fast becoming a necessity for busy professionals.

Several hundred data bases are geared to financial applications for stockbrokers, chief financial officers, investment bankers, analysts, and treasurers. Most data bases used by the financial community have expensive subscription and hourly fees. For example, some brokerage houses spend up to $30,000 a month obtaining the latest quotes, searching for detailed financial data on individual companies, and using the time-sharing facilities provided by some on-line services. Quotron, Dow Jones Quotes, and CompuStat are three of the favorites used by brokers.

Increasingly, personal computers are replacing dumb terminals on financial professionals' desks, thus allowing users to not only view but also manipulate retrieved data. Reflecting this trend, several companies have recently offered software that integrates communications with financial analysis. These packages allow financial data to be downloaded from on-line data bases directly into spreadsheets or preformatted financial and graphics packages.

Before the advent of PCs and lower-cost data base access, the only economists taking advantage of on-line services were those in government or Fortune 500 companies. Times have changed, and along with them, the profile of the typical economic data base user. Vast pools of economic data may now be accessed by consultants, bankers, and academicians. Two of the largest on-line services used by economists are Data Resources (DRI) and Chase Econometrics/Interactive Data Corporation. These two services alone offer more than 300 economic data bases, predominantly numeric data such as export figures and consumer price indexes.

Lawyers and other legal professionals used legal data bases years before the micro explosion. However, since data bases in the past were accessed almost exclusively via expensive, dedicated dumb terminals, only the largest law firms could afford to use these data bases. Now, more than 40 percent of all law firms have at least one microcomputer.

Lawyers are in continual need of current case examples, statutes, and legislative background relating to client problems. The cost of research person-hours, in-house libraries, and other research fees can be staggering. Using on-line data bases such as Lexis and WestLaw, lawyers can cut research costs and save time. Corporate lawyers can now take advantage of a number of data bases devoted exclusively to monitoring trademarks and patents.

Enormous data bases, such as CAS Online, exclusively document the multitude of new chemical compounds that are created every day.

The medical community is faced with the constant challenge of keeping up with the ever-onward march of science and technology. Continuing education for medical professionals is a major undertaking, often postponed due to lack of time. On-line searching can cut down on research time and make ongoing education feasible.

Approximately 50 data bases are geared to the health professions. Doctors can now call up everything from fundamental drug information found in the Physicians' Desk Reference data base, to new drug announcements, scholarly abstracts, and medical news reports. For example, Medline, the data base produced by the National Library of Medicine

(NLM), contains more than 3 million books, journals, technical reports, and other materials. Medline can be accessed via Dialog and BRS or directly through NLM.

The engineering field is as diverse as the financial arena in its applications and information needs. Many engineers, especially in Fortune 1000 companies and large engineering firms, use on-line time-sharing services to run sophisticated models. In addition, more than 175 separate data bases related to engineering have topics that run the gamut from architecture and structural design to environmental impact studies. Enormous data bases, such as CAS Online, exclusively document the multitude of new chemical compounds that are created every day. The energy, chemistry, and environmental fields have at least 30 data bases each. Dialog, Questel, and SDC Search Service are three on-line services that provide large selections of engineering data bases.

Other professionals, such as sociologists, government workers, and journalists, can also find data bases devoted to their needs. Broadcast and print journalists rely increasingly on full text news services, such as Nexis, for instant background on stories they receive over the wire services and from the field. Even the White House is tuned into Nexis for fast retrieval of background information.

Future Prospects

It is clear that the use of on-line services by professionals, business people, academicians, and home hobbyists is expanding and will continue to grow. For many jobs, tapping into financial data bases is becoming a natural and essential function. Although the cost of going on-line is a given for doing business in many large law firms and brokerage houses, with the advance of technology and the increase in the base of users, lower prices for subscriptions to on-line services and easier access to data bases that use artificial intelligence techniques can be expected.

One of the most exciting developments in on-line services is the arrival of natural language interfaces. Using these programs, users can type instructions in everyday language rather than use a confusing and tedious data base query language. Although these packages are in their infancy, more sophisticated yet easy-to-use interfaces can be expected this year.

The trend away from single purpose dumb terminals and toward personal computers will continue. Also, look for the increased use of high-speed 2400-bps and 9600-bps modems to speed data retrieval.

Increasingly, modern society depends on the timely flow of a mass of information that is growing larger by the minute; the on-line industry has arisen in response to this need. The vast amount of information available in electronic libraries is mind-boggling. The tools that make it all manageable are now within our grasp; the result should be a society that is more knowledgeable. As Samuel Johnson wrote: "Knowledge is of two kinds: We know a subject ourselves or we know where we can find information upon it."

Chris Yalonis and Anthony Padgett are principals in the Jupiter Group, a Sausalito, California, management consulting and market research firm specializing in the microcomputer industry.

Bibliographic Retrieval Services (BRS)
Focus: Business
1200 Rt. 7
Latham, NY 12110
800/833-4707, 800/553-5566
New York
Cost: $75 initiation fee, $12 per month minimum charge; prime time: $50 annual password fee, $16 to $35 per hour, data base access charges

(continues)

CompuServe Inc.
Focus: Consumer, mail, business
5000 Arlington Center Blvd.
Columbus, OH 43220
800/848-8199, 614/457-0802
Cost: $39.95 initiation fee, $12.50 per hour prime time, $6 per hour evenings and weekends

Dialog Information Services Inc.
Focus: Business, technical, scientific
3460 Hillview Ave.
Palo Alto, CA 94304
800/227-1927, 415/858-3785
Cost: No initiation fee, data base access charges only

Dow Jones News/Retrieval
Focus: Business, financial
P.O. Box 300
Princeton, NJ 08540
800/257-5114, 609/452-1511
Cost: $75 initiation fee, $1.20 per minute prime time, 20 cents per minute evenings and weekends

General Videotex Corp.
Focus: Business
3 Blackstone St.
Cambridge, MA 02139
800/544-4005, 617/491-3393
Cost: $49.95 initiation fee, $16 per hour prime time, $6 per hour evenings and weekends, data base access charges

Mead Data Central (Nexis or Lexis)
Focus: Full text news, business, law
P.O. Box 933
Dayton, OH 45401
800/227-4908, 513/227-4908
Cost: $100 per month plus $10 per person per month, plus $28 per hour, plus $9 to $18 per search prime time (50 percent reduction evenings and weekends)

NewsNet Inc.
Focus: News
945 Haverford Rd.
Bryn Mawr, PA 19010
800/345-1301, 215/527-8030
Cost: No initiation fee, $24 per hour, data base access charges

SDC Information Services ORBIT
Focus: Business
2500 Colorado Ave.
Santa Monica, CA 90406
800/421-7229, 800/352-6689
Cost: $125, $150, or $600 initiation fee depending on services; data base access charges

The Source
Focus: Consumer
1616 Anderson Rd.
McLean, VA 22102
800/336-336, 703/734-7500
Cost: $49.95 initiation fee, $20.75 per hour prime time, $7.75 per hour evenings and weekends

Vu/Text Information Services
Focus: Business
1211 Chesnut St.
Philadelphia, PA 19107
800/258-8080, 215/854-8297
Cost: $25 for user guide, data base access charges

Directories and Publications

Database Alert
Knowledge Industry Publications, Inc.
701 Westchester Ave.
White Plains, NY 10604
800/431-1880

DataBase Update
10076 Boca Entrada Blvd.
Boca Raton, FL 33433
800/345-8112

DataBasics: Your Guide to Online Information
Garland Publishing
136 Madison Ave.
New York, NY 10016
212/686-7492

DataPro Directory of Online Services
DataPro Research Corp.
1805 Underwood Blvd.
Debran, NJ 08075
609/764-0100

Directory of Online Databases
Cuadra Associates, Inc.
2001 Wilshire Blvd. #304
Santa Maria, CA 90403
213/829-9972

THE PANASONIC® SR. PARTNER™ NO PERIPHERALS NEEDED

Because they're already built-in. The 80/132-column printer. The 9-inch, high-resolution display. There's even a built-in 360K disk drive. Which all make the Sr. Partner a complete computer as is.

The Sr. Partner is IBM hardware and software compatible so you can run popular business programs immediately. The software bundle currently offered with the Sr. Partner is WordStar, VisiCalc, pfs: Graph, File, Report, MS-DOS 2.11 and GW BASIC.*

And with its 256K internal memory expandable to 512K, the Sr. Partner can run the new integrated software.

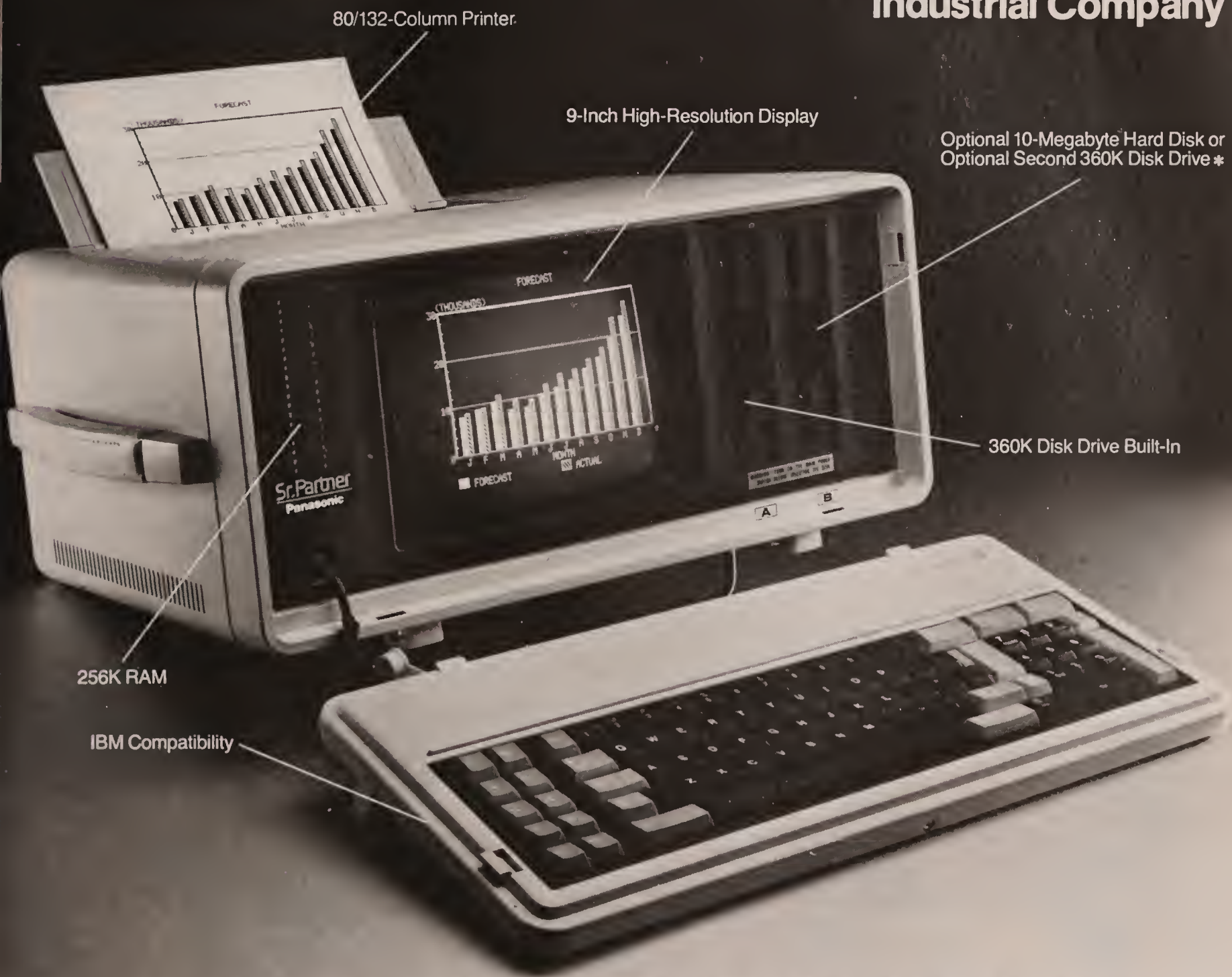
Built-ins also include expansion slots and parallel and serial I/O ports. There's even a built-in RGB monitor port so you can take advantage of the Sr. Partner's color and graphics capability.

If you want 10 megabytes of storage, choose the new hard disk Sr. Partner.

Both the Sr. Partner and the hard disk Sr. Partner come with an exceptional Panasonic warranty.**

For the dealers nearest you, call: 1-800-PIC-8086. The Panasonic Sr. Partner. No peripherals needed. It makes the competition look like Jr. Executives.

Panasonic
Industrial Company



*Software bundle offer subject to change or withdrawal at any time without notice and is not available with Hard Disk Sr. Partner. **One-year limited warranty, 6 months on thermal printer head. Carry-in or mail-in service. Sr. Partner is a trademark of Matsushita Electric Industrial Company Ltd; WordStar is the trademark of MicroPro International Corporation; VisiCalc is the registered trademark of VisiCorp; pfs:Graph, File, Report are the registered trademarks of Software Publishing Corporation; GW BASIC, MS-DOS are the trademarks of Microsoft Corporation.

Circle 694 on reader service card

Islands in the Mainstream

As efforts to join corporate PCs with mainframe systems gather momentum, the potential effects are being hotly debated. Will the new combination of large and small computers destroy the prized independence of PC users—will it take the personal out of personal computing? Or will it make the PC an even better tool?

Bill Weil and Ted Nace

In the past five years, the battle over the role of personal computers in corporations has shifted its focus significantly. In 1980 the question was whether PCs would be accepted into the organization at all. Jan Willey, who at that time was surveying corporations for Input, a market research firm in Mountain View, California, recalls: "I'd talk to a data processing manager and he'd say, 'No way will we allow those little things in.' And then I'd talk to employees in the company and they'd say, 'We've got to have them.' People were sneaking personal computers into the company to satisfy their own requirements."

With the PC's rapid rise from contraband to status symbol, the debate now revolves around the machine's appropriate role. Two groups within a corporation have special interests at stake. On one side are computer users, who value the freedom of having a stand-alone computer devoted exclusively to their particular needs.

On the other side are data processing and information systems professionals, who advocate the use of the personal computer as a workstation connected to mainframes and minicomputers. This group has traditionally controlled the use of corporate computing power and is now seeking to extend its domain to the personal computer.

In some cases the interests of various groups are incompatible; in other cases the two methods of using the small computer can coexist. James Wilson, manager of microcomputer support for Levi Strauss in San Francisco, says, "At one time we saw personal computers competing [with workstations connected to large computers]. Now our philosophy is that it's a continuum and there's room for both."

The World of Corporate MIS

The issue of how best to use desktop computers is rooted in the history of corporate data processing systems. During the past 20 years, most corporate computer systems have been built to accomplish specific functions, such as payroll, order entry, or inventory control. Each system is responsible for one

kind of transaction processing. In addition, the systems usually produce summary and historical reports for corporate management.

As soon as the DP shop installs a new system, requests from corporate managers for additional information inevitably pour in. What do managers want? Typically, their requests do not fit any convenient category such as sales data, inventory data, or payroll data. Instead, managers are looking for information that cuts across operating boundaries—in other words, corporate data. To meet this need, a separate entity has emerged within corporations, commonly known as Management Information Systems (MIS).

Usually, the demands placed on an MIS department are anything but routine, since systems containing different types of information are not designed for consolidation. Each system handles data elements in its own way. For example, many systems contain return on investment, net sales, and account number data, but each system might define and calculate these items differently. To meet a single request, variant sets of data typically have to be "scrubbed," or redefined and recalculated, before being aggregated. Consequently, MIS organizations have become notorious for multiyear backlogs of requests.

Just as MIS organizations began to serve up some palatable solutions to the perennial managerial cravings for convenient information, a different remedy arrived from outside the corporation: the personal computer.

To solve the problem, new mainframe languages have been developed around common data bases, enabling people who lack programming expertise to use terminals connected to a large computer and manipulate the information they need. Ironically, just as MIS organizations began to serve up some palatable solutions to the perennial managerial cravings for convenient information, a different remedy arrived from outside the corporation: the personal computer.

The Pioneers

Personal computers began cropping up in corporations courtesy of the same mavericks who were experimenting with them at home. Cecil Jones, instructor of information systems at Golden Gate University in San Francisco and a strategist with a major financial corporation, compared PC pioneers to early automobile owners. "In order to use a Model T," said Jones, "you had to be mechanically inclined and know how to operate a magneto and an Armstrong crank. And you had to be self-sustaining. You couldn't count on finding repair shops in every town or gas stations on every few street corners."

Similarly, the people who brought PCs into the corporation were on their own, tackling the challenge of installing, operating, and debugging their systems without help from the DP department. But why go through all that trouble? After all, many corporations already offered computer access via time-sharing on large computers. Explains Jones: "If I'm on a time-sharing system my computer can be tied up doing someone else's work. Having my own computer lets me determine my own destiny."

With *VisiCalc* and subsequent software applications, managers gained a greater degree of control over information processing. This new-found power quickly became addictive. "Forget the MIS department," a department head or a corporate analyst could say. "I'll decide what calculations I want to do on the computer and key in the data with my own bare hands."

Compared to other corporate computer expenses, personal computers were so cheap that users could often purchase them without getting special corporate approval. PCs could simply be included in budget categories such as office equipment or furniture. There was no need to involve the DP department in purchasing decisions; in fact, the main reason for importing the technology was the DP support organization's inability to satisfy general computing needs.

Communications Equal Complications

To the early PC users, it didn't matter that each computer was a self-contained island, isolated from the other islands and from the data processing mainland. But once personal computers were up and running, a not-so-strange thing happened: The innovators outfitted with these valuable new analytical tools wanted access to corporate data on the mainframes. Why manually reenter long columns of numbers into a spreadsheet when the information already existed in a mainframe data base? Also, some of the work the PCs did could be greatly simplified if certain calculations were handled by the mainframe computers where the data originated.

Initial efforts to provide personal computers with access to mainframes involved using the PC to emulate a "dumb terminal"—a terminal with no processing power of its own—but this approach was frustrating because users couldn't download data directly into their spreadsheets. Moreover, when personal computer users tried to tap into mainframe data bases, they frequently found themselves lost in the world of communications software, protocol conversion, incompatible data formats, and network hardware (see the sidebar "Close Encounters of the Corporate Kind"). Ironically, the trailblazers began turning to the DP professionals for help.

Support and Standardization

Meanwhile, a new generation of PC user was emerging. Unlike the pioneers, these users relied heavily on the corporation for assistance of all kinds. "Office workers," relates one specialist in office systems support, "are professionals in their own right. They see the PC as a tool—they want results, and they don't care particularly how they get them." As increasing numbers of corporate workers—both clerical and managerial—began using PCs, the demand for assistance grew rapidly. Most corporations responded by setting up some sort of microcomputer support organization, known as the information center or the department of user services.

In assessing the situation, the first thing support organizations saw was, to put it charitably, diversity: Apples trying to talk to TRS-80s, *VisiCalc* trying to talk to *SuperCalc*, *WordStar* trying to talk to *EasyWriter*, and everyone trying to get to the mainframe. To properly assist the people who really needed help, each support organization established a small, standardized set of products from among the countless number on the market. But how rigidly these standards are enforced varies widely. For example, if someone demands *SuperCalc 3* when the support group's listed product is *1-2-3*, one corporation might respond, "No, you can't do that," while another might say, "You can use anything you want, but unless it's *1-2-3*, don't bother calling us for support."

Some corporations shy away from exerting any control over users and merely offer services and support: discounts and central purchasing, upgrades, current information on software bugs, lists of standard products, selection guidelines, training, configuration and programming assistance, and technical troubleshooting. Departments retain both the power to make their own purchasing decisions and the responsibility for any related mistakes.

At the other extreme are corporations that keep desktop computers under tight central control. The information center is the only department authorized to buy hardware or software. The center relies on a restricted list of standard products and makes no exceptions. Such a situation is not common in large corporations, but it does occur: it mirrors the traditional *modus operandi* of data processing departments.

The typical corporate response falls somewhere between those extremes. For example, the procedures used at Sutro and Co., a full-service regional brokerage firm in San Francisco, attempt to accommo-

Close Encounters of the Corporate Kind

When two unfamiliar cultures meet head-on the dialog can become surreal—especially when the topic is computers. In fluorescent-lit hallways across America, the urge to get at corporate data bases is luring the once fiercely independent tribe of personal computer users away from their isolated caves and into contact with an ancient, entrenched civilization—the world of corporate MIS. The result? Meet Amy, head of microcomputer support at Generic International Corporation, and Mike, a Generic planner and spreadsheet ace extraordinaire:

Mike: I'm using a personal computer now for budgeting, planning, financial analysis, that sort of thing. I'm getting along fine with my IBM PC and *Symphony.* As long as I have a PC I might as well use it to get to the mainframe, too. What do you suggest?

Amy: First of all, what do you want to get to the mainframe for? Do you want to get to the VM system for timesharing, the TSO system for program development, or the IMS system for production data? For security reasons I can't give you access to the production system, but . . .

Mike: Whoa. Slow down! I only want to get data out of some *Focus* data bases so I don't have to rekey it into *Symphony.* I don't know what system it's in. Which system do I get when I use the little terminal that you can take home?

Amy: You must mean the Texas Instruments Silent 700. That goes into the VM system. Sure, you can get into that with your PC.

Mike: Good. How do I do it?

Amy: The easiest way is to use TTY emulation. That lets your PC act like a dumb terminal.

Mike: I guess that would work since I use one of those terminals now. But can't I get something that lets me use the whole screen, like what you guys have on your desks?

Amy: You mean turn your PC into a 3278 terminal? To do that you need a special board that costs about $1000. To make that work you need a communications controller, and you don't have one in this building.

Mike: Well, can I get one?

Amy: I don't know if you can justify it. How many terminals are we talking about? Then there's the question of communication ports at the mainframe, lead times for the controller, higher-speed modems, and . . .

Mike: Never mind. Is that the only way to get full screen capability?

Amy: No. There are lots of ways. IBM has a 3101 emulation program that allows you to use dial-up full screen.

Mike: Great. I'll take it.

Amy: Don't be so hasty—it's not easy to set up. You'll want us to do it for you. You'll also have to learn how the keyboard is mapped to emulate a 3101. It takes some getting used to, and it may not meet your needs. Of course, I can't tell because I still don't know what your needs are.

Mike: This isn't working out too well. Any other ideas?

Amy: Well, there's a protocol converter that we could check out. Then you would call the protocol converter instead of the mainframe. If we can make your PC look like a VT 100, I think we can make it work. We'll have to learn more about it. Is this a formal request? Should I add it to my queue? We're planning to do an evaluation of all these alternatives and come up with a strategy. I'm just not sure when we'll be able to get to it.

Mike: Stop! I've had enough. Why does this all have to be complex? Should I just stick with my TI terminal, or can I really use my PC to get to the mainframe?

Amy: I'm sorry, Mike, but it gets a lot worse if you want to load *Focus* data into *Symphony*. We haven't even begun to talk about the problems of how to select the right data from the data base, data compatibility, audit trails, security . . .

Mike: Never mind. I think I'll go home and play with my Macintosh.

date both personal computing and microcomputing. A subsidiary, Computer Systems Design, processes the bulk of company data on IBM and Tandem systems, using five hundred IBM 3270 terminals.

According to Dick Burg, Sutro vice president for systems coordination, about 30 stockbrokers use personal computers as stand-alone office machines, mostly for tax analysis. Corporate policy, as described by Burg, is simple: "We don't support brokers' PCs." However, the corporation gives brokers free reign to do whatever they feel is profitable for them.

The policy is different for staff in the accounting department. Here an additional 30 PCs are used for running spreadsheets and require access to mainframe data. Burg supports these users, offering one standard computer configuration. "I wanted the units to be swappable across the firm," he explains.

The Control Problem

By its nature, automated data processing has always carried the risk that someone might perform the wrong calculation or produce a report using incomplete, out-of-date, misleading, or confidential information. As computer use spreads to untrained people in the corporation, those risks multiply. For example, someone might download data from the mainframe to a floppy disk and walk away with the disk. (To avoid this particular problem, one company uses only PC XTs with the floppy drive removed.) Terminal programs and smart modems that can be programmed to automatically log on to systems and even upload and download data make data base security even more tenuous.

Supporting the swarms of desktop computers that have found their way into corporations may seem like a difficult problem, but it pales next to the

Establishing a Beachhead

Ted Nace

Since the advent of the personal computer, connections between PCs and mainframes have passed through five stages. Achieving the sixth stage—full access to mainframe data and processing power—depends on the establishment of a generic standard for organizing mainframe data. The following breakdown offers a brief approximation of where we've been and where, with any luck, we're headed.

Stage one Initially, PCs were islands, completely cut off from mainframe processing power and data bases.

Stage two Using asynchronous communications programs such as *PC-Talk*, PCs gained the capability to transfer one line at a time to or from a mainframe, via modem.

Stage three Full-screen transmissions became possible with communications software that let a PC emulate an IBM 3101 terminal. But transfers were still slow due to the speed limitations of modems.

Stage four With add-on boards such as IRMA or with the 3270 PC, full emulation of an IBM 3278 display station became possible. But incompatibilities in data structures still hindered the use of mainframe data by programs, such as *1-2-3*, that were originally written for the PC.

Stage five New software products such as *PC/Focus* made it possible to process certain mainframe data on either the PC or the mainframe. Because of differences among mainframe data bases, however, each required its own matching program on the PC.

Stage six Ideally, a generic solution will be achieved—a data standard that enables a PC to access any mainframe data base written for the standard.

dilemma of how to safely and effectively integrate the PC into mainframe corporate data bases. Observes Golden Gate University's Cecil Jones, "The proliferation of PCs makes the underlying problems of data management all the more glaring." Alongside the new problem of corporate data security is the dilemma of incompatibility between different corporate data bases that has long plagued MIS departments. Both problems grow every time a desktop computer is connected to a mini or mainframe computer. Moreover, as shown by the sidebar "Establishing a Beachhead," the hardware and software barriers to PCs' having full access to larger computers are falling by the wayside.

If anything can give nightmares to a DP department high priest, it's the specter of thousands of untrained users romping freely through mainframe data bases. "We haven't quite worked out a solution," admits Vita Cassese, director of the Pfizer Company's pharmaceuticals division, adding that the simplest solution "would be to allow people to read data from the mainframe data base but not write to it."

Input's Ralph Wells elaborates: "You can't allow people to tap into these systems indiscriminately. If the person wants to tap in, he'll just get to download data to the PC. No one will be able to use a PC to alter corporate data bases without the same sort of restrictions that have always been in effect on mainframe terminals: controls, edits, validation."

Bleak or Bright?

We're left contemplating two futures—one bleak, one bright. On the gloomy side we might imagine a crippled corporate PC, robbed by stifling standardization of its ability to offer unique solutions and denied access—because of unresolved incompatibilities and security risks—to the riches of corporate data bases.

A more encouraging prospect is that of an all-purpose PC, functioning both as a true personal computer and as a workstation connected to sophisticated, easy-to-use mainframe data bases. Analyst Wells calls this scenario "the best of both worlds . . . giving people the freedom to use their PCs in a stand-alone mode as they see fit, while also providing access to corporate data."

Which version of the future will come to pass? The answer, says Cecil Jones, depends not so much on anything data processing or information systems may do, but rather on corporate leadership's recognizing the value of information to business. "We have standard accounting practices to manage most corporate resources, but with information the old rules do not apply," says Jones. "Information is an unusual type of currency. Unlike other resources, it *gains* value when it is used."

The implication is that any effort by a company to knit together its information resources more effectively will have reverberant benefits. Engineering a good fit between PCs and corporate computer systems, suggests Jones, should be considered not merely a matter of greater convenience for PC users, but a key to business success in the coming decades. He concludes, "It will determine which companies survive and which fall by the wayside."

Bill Weil is technical services director at Ferrin Corporation, a personal computer services firm that provides development, systems integration, consulting, and training to large corporations. Ted Nace is an Assistant Editor at PC World.

Verbatim®

3½" Single Sided/Double Density
3½" Double Sided/Double Density
5¼" Single Sided/Double Density
5¼" Double Sided/Double Density

Buy Verbatim at the best possible price from Comark. We stock a complete inventory of computer equipment and supplies and can beat many nationally advertised prices!

Clip out the coupon below for more information —or, call NOW for immediate information and prices.

Toll Free **1-800 USA FLEX**
In Illinois **1-312-351-9700**

☐**YES!** Please get in touch with me, I'm interested in Verbatim products at incredible savings!

name _____
company _____ phone (___) _____
address _____
city/state/zip _____

Clip coupon and send to:

COMARK
135 N. Brandon • Glendale Heights, Illinois 60139

Circle 43 on reader service card

Birth of a Sales Tool

The machine may lack a huckster's charisma, but the PC is making its mark as an important contemporary adjunct to the old foot-in-the-door routine.

Melinda Rickelman

Sam Silvertongue, sales director for Amalgamated Mutton Chops, a mid-size company, has a full-size headache. Like most sales gurus, Sam makes it his business to impress his boss (Amalgamated president Marvin Moneybags) by exceeding sales quotas and building the company's bottom line.

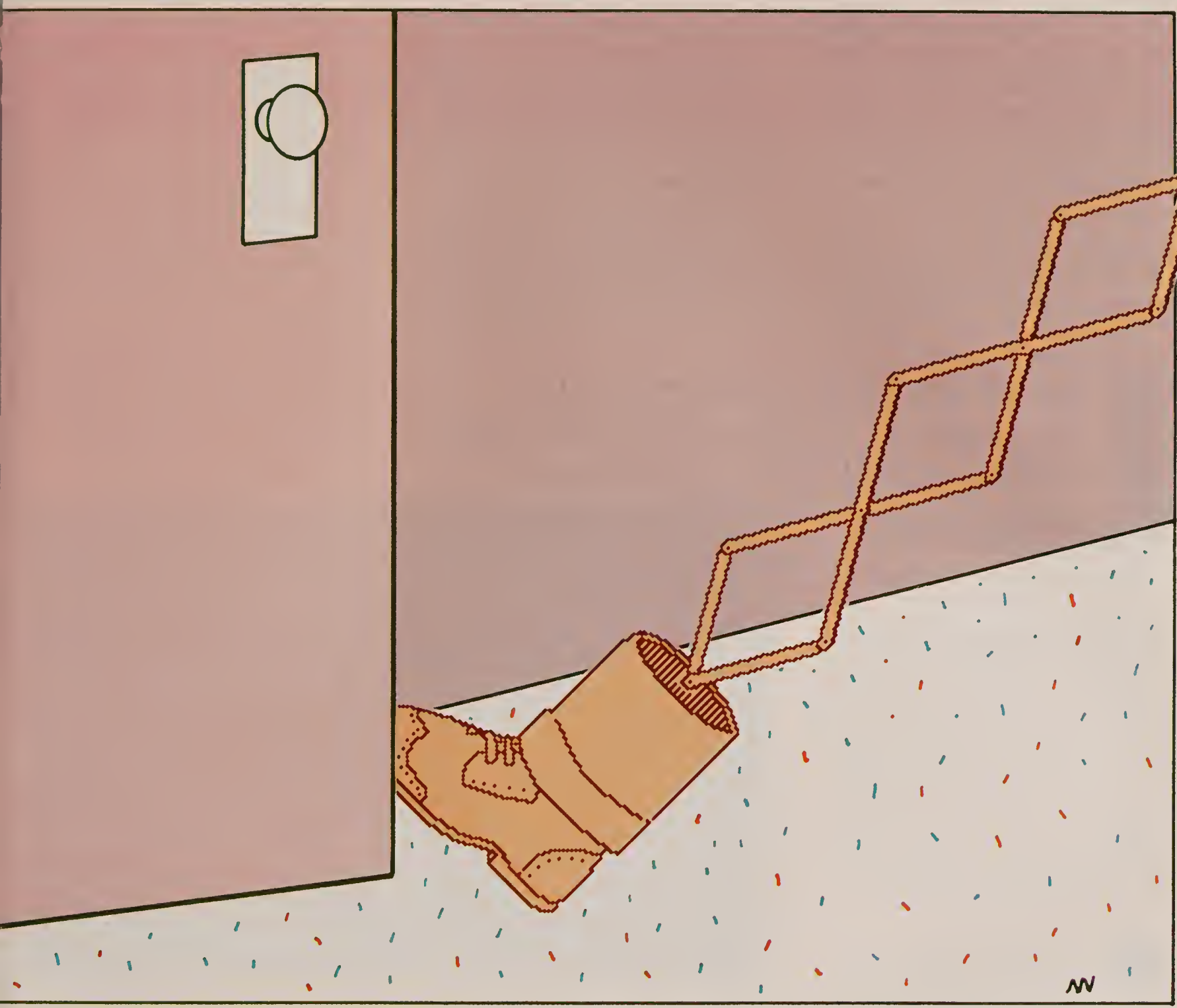
One Monday morning Marv fires off a barrage of questions that Sam can't answer: How many leads are in the pipeline right now? What's the projected sales volume by month-end? Were last quarter's prospects nurtured properly? What's the latest aggregate total on commissions for field sales reps? As usual, Marv wants the answers yesterday.

Sam swallows hard, then mumbles something about having sent a request in to the folks who mind the mainframe, which they can't possibly fulfill for another three weeks. Marv snarls and begins a slow burn, whose heat begins to wilt Sam's budding career . . .

Sales has always been more of an art than a science. The business of selling goods and services is positively steeped in personal chemistry. When intuition is your master, you naturally eschew quantitative tools for qualitative means: a winning smile, a clever rap, a Giorgio Armani suit.

Or so goes the myth. But like all art, sales represents a greater expenditure of perspiration than inspiration. Sales is a business of categorizing, organizing, and monitoring; of targeting prospects and tracking leads; of attending to follow-ups; of corresponding and forecasting and generally doing what you must to obtain and secure a competitive toehold. As it happens, the personal computer excels at perspiration-reducing tasks.

In fact, the broad discipline of sales is gradually becoming familiar turf for the PC, particularly in the hands of enterprising sales forces armed with presentation graphics software, personal computers the size of briefcases, and "intuitive" programs the likes of *ThinkTank* and *The Sales Edge*. The PC is grabbing supporting roles as a direct-sales tool and an invaluable paperwork-buster.



PC for Sale

This gathering momentum for the PC as a modern-day answer to Willy Loman's woes represents a genuine turnabout for sales professionals. Until recently, most companies regarded personal computers as the domain of accounting or financial planning—indeed, of almost any company function but sales.

The experience of PC Wizards, a consulting and training firm based in Walnut Creek, California, is typical. "Most of our clients seek help in automating accounting and payroll functions," says consultant Dave Furano. "Once in a while a company asks for guidance in applying a spreadsheet program to sales forecasting. But many haven't any idea how to automate their sales efforts.

"Two integrated programs—*Framework* and *1-2-3*—are excellent for sales forecasting, but unfortunately, people often think that automation means doing things in a completely new way," Furano continues. "The sales strategy could—and should—stay the same. If you want to computerize your quote form, first create the form, then create the data base, and then have the quote form take information automatically from the data base. The only change to the process is that it no longer needs to be done by hand. But if you try to fool with a workable system, you'll ruin it."

A 1984 Dow Jones survey of companies in 40 industries confirms this traditional skittishness about mixing sales and computer systems. Although 75 percent of

the firms surveyed reported using PCs for financial analysis or repetitive chores such as payroll and inventory control, most were only vaguely aware of the existence of software geared to helping products find a market.

Such programs do exist, and they're increasing in number to match steadily strengthening demand. Sales reps can now call on an eclectic mix of the usual application programs and a new genre of software created with sales in mind. The result is apt to be not only a cleaner desk but rising sales curves as well, reflecting improved responsiveness and increased customer satisfaction.

Perhaps the most compelling reason to automate is the salesperson's fervent wish to make a molehill out of a mountain of paperwork.

Prospecting by PC

The business of every company is selling. Like project management, sales applications appear to be mushrooming into a full-blown family of "horizontal" (as opposed to "vertical," or job-specific) software. Some participants in the automation of the sales game are even grouping these applications under the rubric SMSS, for sales management support systems. According to Michael Lodato, a marketing consultant based in Westlake Village, California, SMSS packages comprise "a new breed of computer system, increasing a salesperson's ability to manage inquiries from point of identification through sales closure and beyond to follow-up sales."

This marriage of sales and software is paying off. Programs add discipline to the mystique of sales through such vehicles as automated tickler files, boilerplate letters, and client follow-ups. Presentation graphics packages open a vast range of personalized appeal formats and make virtually any product or service easier to sell.

Increasingly, the business world is at the sales rep's beck and call: client purchase and payment histories are on line, as are inventory records that yield an ever greater array of product alternatives. Deals can be closed with alacrity, since more efficient preparation boosts the likelihood of a successful transaction. All this in turn increases time devoted to actual sales and bolsters after-sale customer support.

The Big Sell

Perhaps the most compelling reason to automate is the salesperson's fervent wish to make a molehill out of a mountain of paperwork. Three years ago, McGraw-Hill Research scrutinized sales productivity and concluded that sales professionals wiled away more hours on paperwork and related drudgery than they devoted to the actual selling of widgets and gizmos. In light of that glum fact alone, selling sales personnel on the PC is becoming progressively easier.

Consider Ron Felmus, a salesperson at GESCO (General Electric Supply Company), a Connecticut-based GE subsidiary dedicated to distributing electrical supplies. Before he opted for a personal computer, Felmus, who sells his wares to semiconductor manufacturers, had been inundated with reports, analyses, forms, and other corporate effluvia.

Outfitted with a computer, Felmus has dramatically reduced the amount of time spent on paperwork—and that means better service to his clients. After three months at the keyboard, Felmus says that his business "has grown by more than 20 percent. I'm now able to devote more time to my best customers."

Winning With Workhorses

Putting sales on line can be as simple as recognizing the applicability of such workhorse programs as spreadsheets and data base managers to various sales chores. PC Wizards' clients often create sales applications using the *1-2-3* or *dBASE II* packages they originally purchased for other departments, reports Furano.

Spreadsheets are prime examples of programs that aid and abet sales on the scene—and behind it. "What if" analyses can be as useful to a prospective customer examining a life insurance policy as to a sales rep devising pricing strategies or sorting sales figures by territory.

OptionWare offers precisely that flexibility. Gerry Baldwin, a sales director for OptionWare, de-

scribes his company's 60-product family as "a super-sophisticated set of Lotus templates." Included in this battery are applications for the sales pro, from sales call reports and client mailing lists to product market share histories and reports on sales performance against quotas. Says Baldwin, "These templates take enormous advantage of *1-2-3*'s macro capabilities—all the user has to do is enter data" (see Screens 1 and 2).

This ease of use has been a hit with at least one customer. "I use *OptionWare* for product line sales projections, and it's helping me tremendously," says Cindy Preston, a marketing manager for a health-care products firm. "I know what I'm budgeted to sell by type of product and period of time. [The template] keeps me on course or tells me that I'm off. What's also nice about the template is that it's idiot-proof."

Made to Order

Packages designed to simplify a salesperson's life go by names like *Lead Manager*, *Easy-Sales Pro*, *Prospecting*, *Saleseye*, and *SalesPrompt*. Carving a niche in the field is Dow Jones, whose Sales Management Series includes *Prospect Organizer*, *Sales Organizer*, and *Sales Director*; all three share data and can be linked to *1-2-3* for added spreadsheet and graphics capabilities. Most sales-

Screen 1: This OptionWare Sales Call Report template enables a sales rep to track prospects. The template locks on the target in columns A through C, but permits horizontal scrolling through pertinent company data.

Screen 2: The Sales Call Report template builds a client data base, with records tailored to sales prospecting.

specific packages contain discrete functions for handling inquiries, dealing with customers and prospects separately, calculating expenses and commissions, and measuring performance against quotas and plans.

Scratch a salesperson and you'll find a spate of lists lurking right below the surface—lists of customers, contacts, prospects, targets, follow-ups, ad infinitum. Not surprisingly, much of the sales-specific software on the market is a hybrid of data management and word processing. Another genre, however, seeks to be as intuitive as the sales process itself (see the sidebar "Psyching Out the Target").

Portable computers in the mold of the laptop DG/One (see "DG/One for the Road" in this issue) put a dynamic new spin on the roving salesperson's pitch and forge new communications ties with the home office. Texas Instruments' Pro-Lite, another 9-pound wonder, was first marketed as a sales and presentation tool. TI initially skipped retail outlets in favor of encouraging software developers to write applications for on-site product demonstrations—an ambitious attempt to woo buyers from among the Fortune 1000. Both the DG/One and the Pro-Lite feature full-screen 25-line liquid crystal displays capable of conveying relatively crisp animation.

Office-bound salespeople are in an even better position to rely on the PC to save a thousand words—and perhaps the day as well. Sales reps are effectively using presentation graphics packages to generate colorful permutations of charts, graphs, and diagrams, any of which may make the point that cinches the sale (see "The Boom in Business Graphics" in the Special Edition included in this issue). And the sales presentation arsenal is expanding, particularly as Macintosh-like "paint" programs work their way into the business mainstream. Among the snazziest new tools is General Parametrics' Videoshow system, which relies on proprietary hardware and *PictureIt*, an easy-to-use PC-based program, to fashion graphs and charts of unprecedented vividness.

```
Letter # 81
    ------------------------------------------------------------------------
1.1 <To: Marv Moneybags                                                    >
1.2 <From: Sam Silvertongue                                                >
1.3 <Re: Sales leads in AMC's pipeline                                     >

2.1 <Field reports indicate strong interest                                >
2.2 <in our new line of designer mutton chops.                             >
2.3 <Full report due to you next Wed.                                      >
------------------------------------------------------------------------
Letter Type                  : <STANDARD    >
Situation                    : <GRIM, BUT IMPROVED>
Their Response               : <PENDING           >
Our Next Action              : <WED. CONF.>
Days to Next Action          : <4   >
Sales Sequence Level         : <5>
------------------------------------------------------------------------
^F(orward), ^B(eginning of line), ESC = previous line, <RETURN> = next line
```

Screen 3: With the Marketfax boilerplate letter option, the enterprising salesperson can run standard missives or customize them to the crisis at hand. In addition, the form encourages succinct summaries of a given sale or a sales campaign.

Foot in the Boardroom
Arthur Andersen and Company, one of the Big Eight accounting firms, is a trailblazer in adapting the PC to sales-related tasks. The firm originally used its myriad PCs only for auditing and forecasting but recently enlisted all 2600 personal computers to boost an ambitious sales effort for its auditing and consulting arms.

At industry meetings and trade shows, Arthur Andersen personnel feed lead information to PCs on the spot. The data is quickly sorted by location and mailed to the manager nearest the prospect.

Supplementing its lead management program, Arthur Andersen has devised a way to use the PC to help close deals. The plan is part of a complex team approach to client acquisition: Partners, managers, and support staff meet to plot strategy for each potential sale. Before a proposal is made, the team turns to the PC to search a skills bank, identifying other company employees versed in the prospect's field. Other on-line files provide statistics on similar jobs the firm has completed. Data culled in this way enables the firm to assign appropriate staff, anticipate the number of hours and charges a job will require, and present Arthur Andersen's best face to the potential client.

Arthur Andersen's automated system also assists customers post-sale by removing the grunt work from dispatching pertinent updates to them. When information vital to the firm's clients—such as changes in tax legislation—becomes available, PCs are put to work cranking out mailing labels and the like. Brian Kadison, manager of Arthur Andersen's Microcomputer Specialties Team, says the PC-based direct mail system "lets prospects and clients know that we're on top of every issue. It's a service to them that results in more business for us down the line."

Instigating Automation
GESCO, the General Electric subsidiary, boasts a customer base of more than 50,000 electrical contractors and utility companies. GESCO has long been wedded to mainframes, but Wang PCs are steadily gaining in popularity.

Still, the company hasn't widely dispersed its computing resources thus far. That hasn't deterred salesman Joe Roberts, however. Like colleague Ron Felmus, Roberts, an industrial sales representative in GESCO's San Francisco branch, took matters into his own hands by bringing his Macintosh into the office. "The machine increases my reach and efficiency," Roberts says. "It has helped in a big way to organize my approach to selling."

Roberts relies on *MacPaint* to create direct-mail fliers and produce specialized catalogs geared to the varying needs of his clients. This novel approach represents an extra measure of service that isn't lost on customers, he adds.

Like Arthur Andersen's employees, Roberts hits the road with his machine, making the most of the Mac's communications capabilities. "I tap into GE's timesharing network and key in data on a prospect's needs," he explains. The company then applies its mainframe comparative analysis program to the potential client's equipment and comes up with energy-efficient solutions. "It really impresses a prospect to see a proposal come back on the spot," Roberts says.

Paperwork has become far less burdensome. Roberts uses customer record sheets designed to match his *Multiplan* worksheet; preparation that once absorbed an hour now takes 10 minutes. The Mac has also helped him move out small stock items he didn't have the time to sell in precomputer days. "The machine now enables me to call on the smaller customers via mass mailings," Roberts says. "This frees me to concentrate on large custom jobs."

Enterprising Entrepreneur
Big business isn't alone in taking the PC to lunch. At the grass roots, Tom Carroll, a globe-trotting freelance photographer, has turned the PC into a sales companion. Carroll runs his industrial photography business out of his home in Capistrano Beach, California. His "staff" consists of his personal computer and *Marketfax*, a sales package from Scientific Marketing that the company bills as a "human communication accounting system." (See Screen 3 for a sample memo template.)

Carroll generates much of his business through direct mail campaigns—at a rate that was previously impossible. "Since I began using *Marketfax*," he says, "my

Psyching Out the Target

Rick Altman

Some sales software is reaching beyond the mundane realities of lead tracking to knock on the more intuitive doors of human behavior. Programs such as *The Art of Negotiating* from Experience in Software and *The Sales Edge* from Human Edge Software (see "Perfect Pitch," *PCW*, Vol. 2, No. 7) enable salespeople to fine-tune their approach to particular prospects—and subtly manipulate their way to success.

The Sales Edge measures a prospect's degree of extroversion, anxiety, gullibility, and conscientiousness, then prescribes a tactical battle plan based on that profile. *The Art of Negotiating* goes one step further, taking on virtually all arenas of conflict and deliberation.

"Our package gets you to think very logically about your negotiation, whatever it may be," says Roy Nierenberg, president of Experience in Software. "It could be sales, a request to the boss for a raise, or haggling over a painting at an art auction." The program overlooks little in using eight modules to probe for information essential to any confrontation: who's on your side and who isn't; what are the issues, the goals, and the potential problems; and what might conven-

```
                    02  Each side's objectives
____________________________________________________________________

List as many objectives for yourself as you can, in the left-hand column.  Then
list as many as you can for Mugs Malone, on the right.

Make the objectives realistic and specific, but not rigid.

You'll have to keep each objective short, so feel free to abbreviate. Use the
arrows to move from column to column, as well as up and down.
____________________________________________________________________

YOUR OBJECTIVES                    MUGS MALONE'S OBJECTIVES
--------------                     ------------------------
sell vacuum cleaners               squash this scam
make big bucks                     make big bucks
clean up filth                     stay dirty
keep legs intact                   break his legs


ARROWS move cursor; type answer; F10 key moves to next screen.
```

Screen A: The Art of Negotiating gives the discerning sales rep a chance to view both sides of a transaction.

tional strategies yield. The package then moves from fact-finding to framing motivations within what the company calls the emotional climate—both yours and your potential customer's.

"If I play tennis," offers Nierenberg, "my type of serve will determine my opponent's type of return. If you put out positive energy, you'll get positive energy back, but the same is true for negative energy. Suppose I were to make an important sales promotion to a notorious gangster. That would certainly be a highly charged situation, and it's likely that I'd consider the guy a creep. The program would be my restraint, recognizing these feelings as ones to suppress."

Were Nierenberg to pitch vacuum cleaners to Mugs Malone, *The Art of Negotiating* would help him identify which emotional buttons might be pushed in such a meeting and what the results might be. The program might ask him to anticipate how he'd be feeling about Mugs at any given moment, then spin scenarios based on Nierenberg's responses (see Screen A).

Through that process *The Art of Negotiating* provides critical insights about the sales pro in a sales setting. "The program draws things from you, and it makes you think about yourself, but," Nierenberg insists, "it's not spoon-fed pop psychology. While you can get the program up and running in 5 minutes, it's part of a thorough process. A negotiation session will typically require an hour and a half."

Like a data base manager, *The Art of Negotiating* varies in what it can offer depending on the amount of data you feed it. At a session's conclusion you can obtain printed reports documenting the interchange and its projected outcomes.

And Mugs never even knew what hit him.

business has tripled, maybe quadrupled. In the old days I had to track things by hand, one at a time. Now I get results that an individual could otherwise never approach."

Marketfax helps Carroll identify target firms and then deliver the appropriate type of query letter, derived from a program template. If an assignment sends Carroll to Chicago, *Marketfax* will churn out a list of 40 or 50 local prospects who haven't seen his portfolio. He can also add a personal touch with the *Marketfax* word processor. The program wraps up this phase of the job by printing labels. A week after mailing the pitch letters, Carroll uses the program's apppointment calendar and auto-dial features to place follow-up phone calls.

"Now I don't have to wait for the phone to ring," Carroll says. "I can target certain areas and look for very specific types of jobs. You can use 275 potential qualifiers in the program's data base."

Marketfax also handles all the detail work on each prospective client, including the type of assignment (portrait, fashion, or product) and the locale of the shoot. The latter is accomplished via *Marketfax*'s graphics capability, which enables Carroll to compose various lighting scenarios by simulating on-site conditions. Thus informed, Carroll can shape a persuasive, even winning, portfolio.

Tom Carroll is evidence that an automated approach to sales can remain highly personal, and that's what he particularly likes about *Marketfax*. "The best thing about the system is that you design it according to your own needs," he says. "For me, it was operational from day one."

The PC tends to complement the independence of the sales professional. Ultimately, that may be its most salient feature in a sales setting. So far, the machine is doing an admirable job of selling itself.

Melinda Rickelman is a writer and marketing consultant based in San Francisco.

1-2-3
Lotus Development Corp.
161 First St.
Cambridge, MA 02142
617/494-1270
List price: $495
Requirements: 192K, two disk drives

Art of Negotiating
Experience in Software
2039 Shattuck Ave. #401
Berkeley, CA 94704
415/644-0694
List price: $495
Requirements: 256K, two disk drives

dBASE II
Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230
213/204-5570
List price: $495
Requirements: 128K, one disk drive

Dow Jones Series: Prospect Organizer, Sales Organizer, Sales Director
Dow Jones and Co.
P.O. Box 300
Princeton, NJ 08540
800/257-5114, 609/452-2000 New Jersey
List price: $395
Requirements: 256K, two disk drives, DOS 2.00 or later version

Marketfax
Scientific Marketing, Inc.
3303 Harbor Blvd. #G-9
Costa Mesa, CA 92626
714/957-0225
List price: $495
Requirements: 96K, two disk drives

Multiplan
Microsoft Corp.
10700 Northup Way, Box 97200
Bellevue, WA 98004
800/426-9400, 206/828-8088 Alaska and Washington
List price: $195
Requirements: 64K with DOS 1.10, 128K with DOS 2.00 or 2.10; one disk drive

OptionWare
OptionWare Inc.
Corporate Pl.
4 Barnard Ln.
Bloomfield, CT 06002
800/334-2355
List price: $99.95
Requirements: 320K, two disk drives, 1-2-3, DOS 2.00 or later version

The Sales Edge
Human Edge Software Corp.
2445 Faber Pl.
Palo Alto, CA 94303
800/624-5227, 800/824-7325 California
List price: $250
Requirements: 128K, one disk drive

Videoshow/PictureIt
General Parametrics
1505 Solano Ave.
Berkeley, CA 94707
415/524-3950
List price: Videoshow $3499, PictureIt $595
Requirements: for Videoshow color monitor, color graphics board; for PictureIt 256K, two disk drives, DOS 2.00 or later version

The IBM-PC... HOT-LINE

Two Exceptional Modems For Your IBM-PC

Internal

$399

Our ProModem 1200B Gives You A 3rd Serial Comport Free

When you plug our $399 1200/300 baud modem card into your IBM or Compatible PC, you suddenly have an additional serial Comport available to use.

This means you don't have to disconnect your printer, plotter or other serial device from Comport 1 or 2 when you use our ProModem 1200B to communicate with the outside world.

And that's just the beginning. The unit has a host of features such as auto answer and auto dial, programmable intelligent dialing, built-in speaker with volume control, help commands, extensive diagnostics, separate voice and data jacks, and Hayes command set compatibility.

If you check prices, you'll find our $399 ProModem card costs less than modems that don't do nearly as much. ProModem 1200B comes with a sophisticated communications package from Mycroft Labs called "MITE" which provides for transfer of any type of text and binary files, with five error checking protocols including X-Modem. You can't lose. Buy our ProModem 1200B and get a Comport free!

External

$495

Transfer 50 Pages Of Text Without Tying Up Your PC

Priced at just $495, our Hayes Compatible ProModem 1200 is the best 1200/300 baud standalone modem you can buy. It runs rings around Hayes and the rest.

One reason is our optional Communications Buffer and Alphanumeric Display which turn our ProModem into a veritable genius.

Imagine, unplugging your computer, taking it home for the weekend, and while you're gone having ProModem 1200 answer the phone, collect messages, send out electronic mail, and when you return, review all messages sent and received, and the exact time of each event. And we're talking about 50 pages of text or data!

Our $99 Communications Buffer is a card that plugs into ProModem 1200's motherboard. It comes with 2K of CMOS battery backed-up memory, expandable to 64K. Part of the memory is used as a dialing directory, with the balance reserved as a buffer. Plus, for $99 more an Alphanumeric Display can show time, date, and status and help messages.

Whether you go internal or external you'll be the winner if you choose Prometheus.

The Hot Line

PROMETHEUS
PRODUCTS INCORPORATED
4545 Cushing Pkwy. • Fremont CA 94538

Call Now For Complete Info...
415/490-2370

"See us at Comdex booth #5046 West Hall"

Circle 688 on reader service card

Go ahead . . .

TAKE THE CREDIT!

You've made
★ CONROY-LAPOINTE
The World's Largest Computer
Mail-Order Firm!

★ cash discount prices!

★ no annual or membership fee.

So now we bring
★ you the convenience and
preferred status of being one of
OUR VERY OWN CHARGE CUSTOMERS!

Initial minimum purchase
★ is only $400. There's no minimum
purchase amount once your account is open.

As a CONROY-LAPOINTE
★ charge customer, you'll benefit from
the convenience of credit priviledges . . .

- at cash discount prices!
- with no annual or membership fee.
- so you won't tie up personal or company cash.
- so you won't tie up other credit lines.

Circle 554 on reader service card

★ Send in the coupon
for your application

DEALERS WE BUY EXCESS INVENTORIES

W17

ORDER NOW (800) 547-1289

TELEX 910 380 3980

ALL MAIL:

12060 SW Garden Place, Portland, OR 97223

DISKETTES

★ CONROY-LAPOINTE™ DISKETTES ★
We guarantee these top quality products with our name
5 YEAR LIMITED WARRANTY Discounts on orders w/o labels

10 ea DS/DD, (IBM, H/P) 48 Trk, W/FLIP BOX		$ 15
100 ea DS/DD, (IBM, H/P) 48 Trk		$ 119
1000 ea. DS/DD, (IBM, H/P) 48 Trk		$ 859
IBM PRE-FORMATTED		
10 ea, DS/DD, 48 Trk W/FLIP BOX		$ 19
100 ea, DS/DD, 48 Trk		$ 149
1000 ea, DS/DD, 48 Trk		$ 959
DOUBLE-SIDED, DOUBLE DENSITY		
CDC, 10 ea, DS/DD, 40 Trk (IBM, H/P)	$ 75	$ 23
100 ea, DS/DD, 40 Trk (IBM, H/P)	$ 750	$ 295
DYSAN, 10 ea, DS/DD, (IBM, H/P)	$ 69	$ 35
MAXELL, 10 ea, DS/DD, MD2 (IBM)	$ 75	$ 26
VERBATIM, 10 ea. DS/DD, MD34 (IBM)	$ 84	$ 29
HIGH DENSITY DISKETTES FOR IBM-AT		
MAXELL, 10 ea DS/OD (IBM-AT)	$ 77	$ 49
MEMOREX, 10 ea DS/OD (IBM-AT)	$ 84	$ 54

★ GENERIK DISKETTES ★
Top quality, w/jackets, no labels Quantity discounts
90 day "No hassle, money back guarantee"

100 ea, DS/DD, 48 Track, (IBM, H/P)		$ 95
250 ea, DS/DD, 48 Track (IBM, H/P)		$ 229

PRINTERS

DOT MATRIX:	LIST	CONROY
EPSON,		
RX80+ F/T — frict or tractor	$ 369	CALL
FX80+ — 160 cps/80 col.	$ 569	CALL
FX100+ — 160 cps/136 col.	$ 849	CALL
JX80—Color Printer, 160 cps	$ 799	CALL
LQ1500—200 cps DO & 67 cps LO	$1395	CALL
MANNESMANN-TALLY,		
Spirit-80 - 80 cps/80 col.	$ 269	$ 219
MT160 - 160 cps/80 col.	$ 798	$ 568
MT180 - 160 cps/132 col.	$1098	$ 778
OKIDATA, Okimate 20—Color, Hi Res	$ 268	$ 208
82A - 120 cps/80 col/para	$ 349	$ 319
83A -120 cps/132 col/para	$ 749	$ 599
84 -200 cps/136 cps/para	$ 999	$ 729
92 - 160 cps/80 col/para.	$ 499	$ 399
93 - 160 cps/136 col/para.	$ 799	$ 639
2410P - Pacemark/350 cps/para	$2995	$1975
STAR MICRO, SG10 - 120 cps DO, 30 cps NLO NEW	$ 299	$ 249
SG15 - 120 cps DO, 30 cps NLO 16K NEW	$ 499	$ 419
SD10 - 160 cps DO, 40 cps NLO NEW	$ 449	$ 379
SD15 - 160 cps DO, 40 cps NLO, 16K NEW	$ 599	$ 509
SR10 - 200 cps DO, 50 cps NLO NEW	$ 649	$ 549
SR15 - 200 cps DO, 50 cps NLO, 16K NEW	$ 799	$ 679
TOSHIBA, Prop spacing & hi res graphics		
1351—192 cps (DO) & 100 cps (LO)	$1895	$1375
1340—144 cps (DO) & 54 cps (LO)	$ 995	$ 750
Bi-directional Tractor Feed	$ 195	$ 175
LETTER-QUALITY:		
JUKI, 6300—40cps/para.	$ 995	$ 795
6100—18 cps/para/3 pitch	$ 599	$ 439
TOSHIBA, Prop. spacing & hi-res graphics		
1351—192 cps (DO) &100 cps (LO)	$1895	$1375
1340—144 cps (DO) & 54 cps (LO)	$ 995	$ 795

MONITORS

AMDEK, Color 300 Comp/Audio	$ 349	$ 249
Color 500 Comp/VCR/RGB/Audio	$ 525	$ 385
Color 600 Hi Res, RGB/Audio	$ 599	$ 459
Color 700 Ultra Hi Res, RGB	$ 749	$ 549
Color 710 Ultra Hi Res, Phos	$ 799	$ 599
300G, 12" Green	$ 179	$ 129
300A, 12" Amber	$ 199	$ 149
310A, 12" Amber, (IBM)	$ 230	$ 159
PRINCETON, HX-12, Hi Res, RGB	$ 795	$ 495
SR-12, Hi Res, RGB	$ 799	$ 599
Scan Doubler for SR-12	$ 249	$ 179
MAX-12, Amber (monochrome)	$ 249	$ 199
QUADRAM, Amberchrome, 12" Amber	$ 250	$ 165
Quadchrome 12" RGB Color	$ 695	$ 495
Quadchrome II, 14" RGB Color	$ 650	$ 450
Quadscreen 17" 968x512 w/cable, Hi Res	$1995	$1595
ZENITH, ZVM122, 12" Amber	$ 159	$ 95
ZMV123, 12" Green	$ 149	$ 89
ZMV124, 12" Amber	$ 200	$ 139
ZMV135, 12" Color	$ 599	$ 499

MODEMS

ANCHOR, Signalman Mark XII (IBM)	$ 399	$ 259
HAYES, 2400B External Modem (IBM)	$ 899	$ 699
Smartmodem 1200B (IBM)	$ 549	$ 389
Smartcom II Software (IBM)	$ 149	$ 107
Stack Chronograph (RS-232)	$ 249	$ 189
Smartmodem 1200 (AP or IBM)	$ 599	$ 429
NOVATION, J-Cat, 300 Baud Modem	$ 149	$ 104
ACCESS 1-2-3 1200B Modem + Crosstalk (IBM)	$ 595	$ 369
PROMETHEUS, 1200 Standalone Modem	$ 495	$ 345
ProModem 1200B (IBM)	$ 399	$ 289
QUADRAM, Quadmodem, Internal (IBM)	$ 595	$ 425
Quadmodem, External, (IBM)	$ 895	$ 495
VENTEL, PC Half Card (IBM)	$ 549	$ 389
1200 Plus, External (IBM)	$ 499	$ 429
PC 1200, Internal (IBM)	$ 499	$ 379

ACCESSORIES

CURTIS, Diamond, 8 outlets, switched	$ 50	$ 29
Emerald, 6 outlets, 6' cord	$ 80	$ 35
Ruby, 6 outlets, 8' cord, filter	$ 90	$ 52
Sapphire, 3 outlets, w/filter	$ 80	$ 46
INNOVATIVE, Flip-n-File 50 (disk holder)	$ 22	$ 15
KENSINGTON, Masterpiece (IBM)	$ 140	$ 99
Printer Stand NEW	$ 30	$ 20
NETWORX, Wiretree 4 outlet w/filt & surge	$ 70	$ 39
Wiretree Plus	$ 100	$ 59
PROD TECH INT'L, Uninterruptable Power Supply		
200 Watts, PC200 for IBM-PC	$ 359	$ 229
300 Watts XT300 for IBM-XT	$ 499	$ 379
800 Watts, AT800 for IBM-AT 72 lbs		CALL

THE WORLD'S LARGEST COMPUTER MAIL ORDER FIRM

CONROY-LA POINTE INC.SM

SAVE 25% - 75% OFF LIST !!!

All Rights Reserved © 1984 by Conroy-LaPointe Inc.

FOR YOUR IBM-PC, XT, AT or JR W17

COMPUTER SYSTEMS

— Call for Details —

256K IBM - PC

360K Disk Drives by CDC

90 Day Limited Warranty By Us

COMPAQ Portable, 256K 2 360K Disk Drives — CALL

SANYO 256K, 2 320K Disk Drives — CALL

ZENITH Z150, 256K 2 320K Disk Drives, MS DOS 2.1 8088 Chip, 2 S/P — CALL

HARD DISKS & TAPE BACKUP

KAMERMAN, Internal 10 meg kit (Megaflight 100)	$ 895	$ 749
External 10 meg kit	$1295	$1095
MF-10/10, H Disk, tape back, cont, power	$2295	$1795
MAYNARD, Internal 10 meg kit w/cont. (WS1)	$1595	$1150
MICRO SCIENCE, 10 meg w/controller	$ 895	$ 695
QUADRAM, Quaddisks Int w/controller,		IN STOCK
RANA, External 10 meg w/controller	$1495	$1095
Internal 10 meg w/controller	$ 995	$ 795
TALLGRASS, 12 meg disk, 20 meg tape, intl	$3044	$2124
25 meg disk, 55 meg tape, intf.	$3660	$3160

FLOPPY DISK DRIVES

CDC, Limited 30 day warranty. Call for quantity prices

FULL HEIGHT,		$149
HALF HEIGHT,		$129
IBM, Disk Drive Controller Card	$ 195	$ 125
MAYNARD, Controller Card w/para port	$ 300	$ 185
Controller Card w/serial port	$ 310	$ 195
Sandstar Cont Card (accepts 3 modules)	$ 265	$ 205
PERFECT DATA, Head Cleaning Kit	$ 16	$ 12

OTHER HARDWARE

	LIST PRICE	CONROY PRICE
AST,		
SixPak Plus, 64K		$259
SixPak Plus, 256K, S/P/CC + S/W	$ 695	$ 395
SixPak Plus, 384K, S/P/CC + S/W	$ 895	$ 465
Game Port for SixPak	$ 50	$ 39
Preview™ Graphics Card w/para, 64K	$ 399	$ 299
Advantage™ Multif Bd for AT, 128K	$ 595	$ 445
I/O Plus II, S/P/CC	$ 215	$ 150
I/O Plus II, S/P/CC/G	$ 265	$ 185
I/O Plus II, 2S/P/CC/G	$ 315	$ 215
Port Kits - ser, para, or game, ea.	$ 50	$ 39
MonoGraphPlus™ P/CC (for Lotus)	$ 495	$ 375
PCNet, Starter Kit, PC002	$1090	$ 790
PCNet, Circuit Board, PC001	$ 695	$ 365
MegaPlus Products IN STOCK		CALL
COMX, NEW		
EconoRAM™ Plus 384K to 1.5 meg board, S/P/CC/G Fastrak & Spooler		$265
EconoRAM™, full 384K board	$ 295	$ 195
CURTIS, UNI-I Monitor tilt/swivel base	$ 50	$ 39
3-9 foot Keyboard Extension Cable	$ 40	$ 30
HAUPPAGE (HCW), 8087 Chip	$ 175	$ 149
8087 Math Pak (Chip & softw.)	$ 295	$ 235
8087 Software Pak	$ 180	$ 138
HAYES, Mach II Joystick	$ 45	$ 29
Mach III (PC or Jr.)	$ 55	$ 35
HERCULES, Color Card w/para	$ 245	$ 169
Mono Graphics Card	$ 499	$ 329
IBM, Disk Drive Controller Card	$ 195	$ 125
KENSINGTON, Masterpiece™	$ 140	$ 99
PC Saver™ Line Cord w/Filter	$ 50	$ 35
KEY TRONIC, KB5151, Std. Keyboard	$ 255	$ 195
KB5150, Std. Keyboard	$ 209	$ 159
KOALA, Speed Key System	$ 100	$ 63
Speed Key Tables w/software	$ 200	$ 139
Koala Pad w/PC Design	$ 150	$ 89
MAYNARD, SAND STAR SERIES		
Multifunction (6) Card	$ 89	$ 79
Memory Card no RAM	$ 199	$ 169
Memory Card 256K	$ 495	$ 395
Floppy Cont Card (accepts 3 modules)	$ 265	$ 205
Hard Disk I/F Module	$ 499	$ 399
Hard Disk Cable	$ 30	$ 27
Serial Port Module	$ 95	$ 79
Para or Clock Cal. Module, ea	$ 59	$ 49
Game Adapter Module	$ 49	$ 43
Memory Module, QK	$ 122	$ 99
Memory Module 256K	$ 422	$ 357
10 meg Hard Disk Kit & Cont Card	$1595	$1150

OTHER HARDWARE

	LIST PRICE	CONROY PRICE
MICROSOFT, Mouse (for PC)	$ 195	$ 135
Serial Mouse	$ 195	$ 135
System Card, 64K	$ 395	$ 275
System Card, 256K	$ 625	$ 450
MOUSE SYSTEMS, PC Mouse & Paint	$ 295	$ 189
PARADISE, Modular Graphics Card	$ 395	$ 285
Parallel or Serial Port, ea	$ 95	$ 65
PERSYST, NEW		
PC/Mono Board, w/para port	$ 250	$ 195
PC/Color Graphics Bd w/light pen & I/F	$ 244	$ 176
BQB Board Color Adapter, hi res	$ 595	$ 465
PLANTRONICS,		
Color Bd & Colormagic, 16 color w/para	$ 559	$ 395
Color Bd & Draftsman, 16 color w/para	$ 559	$ 395
QUADRAM,		
Quadboard 64K, to 384K, S/P/CC/G		$245
Quadboard, no RAM, expand to 384K	$ 295	$ 225
Quadboard 256K, to 384K, S/P/CC	$ 395	$ 295
Quadboard, 384K (full), S/P/CC/G	$ 795	$ 495
Quadboard II, no RAM, to 256K	$ 295	$ 215
Quadboard II, 64K, to 256K, 2S/CC	$ 395	$ 265
Quadboard II, 256K, 2S/CC	$ 595	$ 395
Quad 512 + 64K w/serial port	$ 325	$ 245
Quad 512 + 256K w/serial port	$ 550	$ 399
Quad 512 + 512K w/serial port	$ 895	$ 625
Quadcolor I, board, 4 colors	$ 295	$ 195
Upgrade Quadcolor I to II kit	$ 275	$ 199
Quadvue, board, Mono, S/P/CC	$ 345	$ 269
Quadchrome Monitor, 12" RGB Color	$ 695	$ 495
Quadchrome II Monitor, 14" RGB Color	$ 650	$ 450
Amberchrome Monitor, 12" Amber	$ 250	$ 165
Quad 3278	$1195	$1050
Quadnet VI	$2295	$1545
Quadnet IX	$1995	$1745
Quadlink	$ 495	$ 385
Quadsprint	$ 645	$ 495
TG PRODUCTS, Joystick	$ 45	$ 29
WICO, Smartboard Keyboard	$ 400	$ 279

★ ★ FOR YOUR PC-JR ★ ★

	LIST PRICE	CONROY PRICE
KEY TRONIC, KB5151 Jr Keyboard	$ 255	$ 195
KOALA, Touch Tablet for Jr	$ 125	$ 75
MICROSOFT, Booster 128K w/Mouse	$ 495	$ 339
Serial Mouse	$ 195	$ 135
MOUSE SYSTEMS, Mouse (for Jr.)	$ 195	$ 125
QUADRAM, Expansion Chassis	$ 695	$ 540
Memory Expansion Board (128K, P/CC)	$ 275	$ 215
TECMAR, Jr Captain	$ 395	$ 325

CHIP & MEMORY SPECIALS

★ 256K ★ CHIP KIT

$99

9 Each, 4256 chips 150 ns

$13 ea.

4256 chip, 150 ns

★ 64K ★ CHIP KIT

$19

9 Each, 4164 chips 90 Day Warranty by us

PRICES ARE DROPPING, SO CALL!

Call for Larger Quantity Prices

NEW!

★ ComX ★

EconoRAM Plus™

$265

384K Multifunction RAM Board expandable to 1.5 Megabyte

Works like AST SixPakPlus™ with capacity for up to 1.5 meg. game port. Fastrak™ RAM Disk and Spooler Software

EconoRAM™ 384K Single Function Board

$195

With Fastrak™ and Spooler
Fully Compatible, 1 Year Limited Warranty
Works on DOS 1.1, 2.0 or 2.1
Prices and availability subject to change Call

SOFTWARE FOR YOUR IBM-PC, XT, AT or JR

BUSINESS

	LIST PRICE	CONROY PRICE
ASHTON-TATE, Framework	$ 695	$ 349
dBase III	$ 695	$ 359
dBase II, (req PC-DOS & 128K)	$ 495	$ 289
Upgrade II & III	$ 200	$ 119
ATI, Training Programs—Large Inventory	$ 75	$ 50
BPI, Job Cost Accounting or Inventory, ea	$ 795	$ 495
General Acctg. AR, AP, or PR, each	$ 595	$ 365
BRODERBUND, Bank St Writer (PC or Jr.)	$ 80	$ 49
CDEX, Training Programs—Large Inventory	$ 70	$ 45
CONTINENTAL, Ultrafile (PC)	$ 195	$ 115
Tax Advantage (PC or Jr.)	$ 70	$ 40
FCM (Filing, Cataloging, Mailing)(PC)	$ 125	$ 75
Property Management (PC)	$ 495	$ 295
DATA TRANS., Fontrix NEW	$ 125	$ 75
DOW JONES, Investment Evaluator	$ 149	$ 99
Market Manager Plus	$ 249	$ 219
Market Analyzer or Market Microscope	$ 349	$ 219
Spread Sheet Link	$ 249	$ 159
FOX & GELLER, Quickcode III	$ 295	$ 185
Quickcode or dGraph, each	$ 295	$ 185
dUtil (DOS or CP/M86)	$ 99	$ 59
HARVARD, Total Project Manager	$ 495	$ 295
Harvard Project Manager	$ 395	$ 225
HAYDEN, Pie Writer	$ 200	$ 125
Pie Speller	$ 50	$ 30
HOWARDSOFT, Tax Preparer '85	$ 295	$ 195
Kit for California	$ 125	$ 83
HUMAN EDGE, Mind Prober (PC or Jr.)	$ 50	$ 32
Communications Edge (PC)	$ 195	$ 119
Sales Edge	$ 250	$ 159
Management Edge	$ 250	$ 159
Negotiation Edge	$ 295	$ 185
IUS, EasyWriter II System	$ 350	$ 250
EasySpeller II	$ 85	$ 125
GL, AR, AP, OE or INV, each	$ 595	$ 375
KENSINGTON, Easy Link Mail Manager	$ 95	$ 59
LIFETREE, Volkswriter Deluxe	$ 295	$ 159
LIVING VIDEOTEXT, Think Tank	$ 195	$ 105
LOTUS, 1-2-3	$ 495	$ 309
Symphony	$ 695	$ 465

BUSINESS

	LIST PRICE	CONROY PRICE
MOBS, Knowledgeman	$ 500	$ 300
MECA, Managing Your Money (PC)	$ 195	$ 125
Managing Your Money Cartridge (Jr)	$ 199	$ 179
MICROPRO, WordStar (PC)	$ 350	$ 189
WordStar (Jr)	$ 195	$ 115
WordStar 2000	$ 495	$ 295
WordStar 2000 Plus	$ 595	$ 325
WordStar Professional Plus	$ 695	$ 395
WordStar Professional, 4 Pak	$ 495	$ 265
MailMerge, SpellStar or StarIndex, ea	$ 99	$ 54
ProOptions Pak (MM/SS/SI)	$ 195	$ 105
InfoStar Plus (+Starburst)	$ 595	$ 315
Correct Star	$ 145	$ 77
MICRORIM, RBase Series 4000	$ 495	$ 259
Extended Report Writer	$ 150	$ 95
RBase Clout	$ 195	$ 125
MICROSOFT, Spell	$ 50	$ 32
Multiplan (PC or Jr)	$ 195	$ 125
Chart or Project, each	$ 250	$ 159
Word	$ 375	$ 235
MONOGRAM, Dollars & $ense w/Forecast	$ 180	$ 99
MULTIMATE, Multimate Ver. 4.0	$ 495	$ 295
OPEN SYS, GL, AR, AP, PR, INV, or PO, ea	$ 695	$ 420
PEACHTREE, Back to Basics GL	$ 295	$ 175
Peach Pak (GL/AR/AP)	$ 395	$ 225
Peach Text 5000	$ 295	$ 179
QUADRAM, Tax Strategy	$ 395	$ 295
Investment Strategy	$ 395	$ 295
QUE, Using 1-2-3	$ 15	$ 12
1-2-3 for Business	$ 15	$ 12
Using Symphony	$ 20	$ 15
SAMNA, Word Plus	$ 295	$ 185
Word III	$ 550	$ 279
SATELLITE, WordPerfect (PC)	$ 495	$ 335
WordPerfect (Jr)	$ 69	$ 45
SOFTW. ARTS, Visicalc	$ 179	$ 109
Spotlight	$ 150	$ 95
TK Solver (specify DOS)	$ 399	$ 269
SOFTWARE INT'L, Open Access	$ 695	$ 379

BUSINESS

	LIST PRICE	CONROY PRICE
SOFTWARE PUBL. PFS Report	$ 125	$ 79
PFS:File	$ 140	$ 89
PFS:Write	$ 140	$ 89
PFS:Graph	$ 140	$ 89
PFS:Plan	$ 140	$ 89
PFS:Proof or PFS Access, each	$ 95	$ 59
SORCIM, SuperCalc III	$ 395	$ 245
STONEWARE, Advanced DB Master	$ 595	$ 375
THORN EMI, Perfect Pak (Jr) (Write/Spell/Thesaurus)	$ 139	$ 89
VISICORP, VisiCalc 4	$ 250	$ 159
WARNER, Desk Organizer (PC or Jr)	$ 195	$ 125

UTILITIES

BORLAND, Sidekick (PC or Jr)	$ 55	$ 32
Sidekick (Copiable (PC or Jr)	$ 85	$ 50
Turbo Pascal (PC or Jr) NEW VERSION	$ 70	CALL
Toolbox (PC)	$ 50	$ 32
3 Pak (Pascal, Turbo Tut, Toolbox)	$ 105	$ 65
CENTRAL POINT, Copy II PC NEW VERSION	$ 40	$ 23
COMX, Fastrak™, RAM/Disk emulator & printer spooler For any PC/DOS or RAM Card Menu Driven	$ 100	$ 59
DIGITAL RES., CP/M-86™ (PC/XT)	$ 100	$ 64
CBASIC 86™ (CP/M-86)	$ 200	$ 135
CBASIC Compiler (CP/M-86 or PCDOS, ea)	$ 600	$ 395
Concurrent CP/M-86™ w/windows	$ 350	$ 225
PL/1 (PCDOS)	$ 750	$ 495
Speed Prog Pkg (CP/M-86)	$ 200	$ 135
DR LOGO-86 (CP/M-86)	$ 150	$ 99
EPYX, In Stock		CALL
FUNK SOFTWARE, Sideways	$ 60	$ 40
IBM BASIC Cartridge (Jr)	$ 75	$ 69
HAYES, Smartcom II (Data Comm.)	$ 149	$ 99
LIFEBOAT, Lattice C	$ 500	$ 295
MICROSOFT, Macro Assembler	$ 100	$ 69
BASIC Compiler	$ 395	$ 259
Business BASIC Compiler	$ 450	$ 300
C Compiler	$ 500	$ 259
COBOL Compiler	$ 700	$ 459
FORTRAN Compiler	$ 350	$ 229
PASCAL Compiler	$ 300	$ 199

UTILITIES

	LIST PRICE	CONROY PRICE
MICROSTUF, Crosstalk XVI (PC or Jr)	$ 195	$ 129
MOUSE SYSTEMS, PC Paint	$ 99	$ 69
NORTON, Utilities (14 prgms) NEW VERSION	$ 100	$ 65
OPEN SYSTEMS, BASIC Interpreter	$ 195	$ 130
ROSESOFT, Prokey	$ 130	$ 79
WESTERN UNION, Easy Link Mail Mngr	$ 95	$ 59

HOME & EDUCATIONAL

ARMONK Executive Suite	$ 40	$ 27
BPI, Personal Accounting	$ 99	$ 63
CONTINENTAL, Home Accountant (Jr)	$ 75	$ 59
Home Accountant Plus (PC)	$ 150	$ 90
DOW JONES, Home Budget	$ 139	$ 92
KOALA, Graphics Exhibitor (Jr)	$ 40	$ 25
MONOGRAM, Dollars & $ense w/forecast	$ 180	$ 110
SCARBOROUGH, MasterType (PC or Jr)	$ 40	$ 25
Your Personal Net Worth	$ 100	$ 63
SIMON & SCHUSTER, Typing Tutor III	$ 50	$ 33

PLUS: BPI, CBS, COMPREHENSIVE, DAVIDSON, HARCOURT, PBL CORP.

RECREATIONAL

BLUECHIP, Millionaire, Barron, Tycoon, ea	$ 60	$ 39
BRODERBUND, Large Inventory In Stock		CALL
ELECTRONIC ARTS, Large Inventory In Stock		CALL
HAYDEN, Sargon III (Chess)	$ 50	$ 34
INFOCOM, Large Inventory In Stock		CALL
Hitchhiker's Guide	$ 40	$ 25
Zork I, II, or III, ea	$ 40	$ 25
MICROSOFT, Flight Simulator (PC or Jr)	$ 50	$ 33
ORIGIN, Ultima III (PC or Jr)	$ 60	$ 39
PROFESSIONAL, Trivia Fever (PC or Jr)	$ 40	$ 25
SIERRA/ON-LINE, Ultima II (PC or Jr)	$ 60	$ 49
Frogger	$ 35	$ 23
SPECTRUM HOLOBYTE, Gato	$ 40	$ 25
SPINNAKER, President's Choice, Amazon Fahrenheit, Rendezvous, Dragon each	$ 40	$ 25

CASH-n-CARRY COMPUTER STORES, INC.

Retail Sales only. Store prices may vary.

SAN FRANCISCO — 550 Washington Street (at Montgomery, opposite the Pyramid). Interstate 80, to Highway 480, take Washington Street Exit CALL (415) 982-6212.
PORTLAND, OREGON — At Park 217, Tigard at intersection of Highways 217 and 99W CALL (503) 620-5595.
SEATTLE, WASH. — 3540 128th Ave. SE, Bellevue 98006. In Loehmann's Plaza near Factoria Square. SE of Highway 405 & 90 and at SE 36th and Richards CALL 641-4736.

OUR REFERENCES:

We have been in computers and electronics since 1958, a computer dealer since 1978 and in computer mail order since 1980. Banks: 1st Interstate Bank, (503) 643-4678. We belong to the Chamber of Commerce (503) 228-9411, and Direct Marketing Association, or call Dunn and Bradstreet if you are a subscriber. Recipient of OREGON BUSINESS MAGAZINE's 1984 Enterprise Award

MasterCard VISA American Express Card CONROY-LAPOINTE CARD

NO SALES TAX

CALL (800) 547-1289
In Oregon (800) 451-5151
TELEX 910 380 3980

Foreign & Portland Residents Call (503)620-9877

QUESTIONS on your order (503) 620-9878 WEEKDAYS ONLY

ORDER DESK HOURS Mon-Fri—6AM to 6PM PST Saturday—10AM to 4PM PST (6AM here is 9AM in New York)

CONROY-LAPOINTE CREDIT CARD W17

Send me a Conroy-LaPointe credit application form so I can get cash discount prices with credit card convenience. $400 Minimum initial purchase

NAME

ADDRESS

CITY STATE ZIP

MAIL TO: 12060 SW Garden Place, Portland, OR 97223

ORDERING INFO & TERMS:

MAIL TO: 12060 SW Garden Place, Portland, OR 97223 — Include your telephone number; double check your figures for Shipping, Insurance and Handling (SIH). All items usually in stock. NO C.O.D. Cashiers checks, money orders. Fortune 1000 checks and government checks honored immediately. Personal and other company checks—allow 20 days to clear. Prices reflect 3% cash & Conroy-LaPointe Credit Card discount, so ADD 3% to above prices for VISA/MasterCard/American Express. Your cards NOT charged til we ship. Add SIH CHARGES: U.S. Mainland, 3% ($5 minimum) for standard UPS ground, UPS Blue, 6% ($10 min), for U.S. Postal APO or FPO, 6% ($10 min). Alaska—Postal Canada, 12% ($15 min). Foreign orders except Canada, 18% ($25 min). Monitors by Postal or to foreign countries, 30% ($50 min). Orders received with insufficient SIH charges will be refunded. All prices, availability and specifications subject to errors or change without notice, so call to verify. All goods are new, include warranty and are guaranteed to work. Due to our low prices and our assurance that you will get new, unused products—ALL SALES ARE FINAL. We do not guarantee compatibility. Call before returning goods for repair or replacement. ORDER DESK HOURS—6AM to 6PM PST, Monday through Friday, Saturday 10 to 4. (6AM here is 9AM in New York.) EconoRAM™, Fastrak™ and Generik™ are trademarks of ComX Corporation.

Gateways to On-Line Services

If complex command languages and an overwhelming array of choices stand between you and the power of on-line data base searching, gateway intermediaries may play St. Peter.

Jeremy Joan Hewes

Commercial data bases and information services offer a huge variety of facts, figures, bibliographic citations, and up-to-the-minute news and financial data. But each service has a different logon procedure, a unique set of commands, and a varying amount of on-line assistance. In addition, some services are so complex in content and structure that you have to master a specialized language to locate and retrieve the information you need.

Recently, several firms have sought to eliminate the inconsistencies among data bases and information services by establishing communications "gateways." Essentially, gateways are English-language interfaces for the communications process; they consist primarily of software that provides a menu or a series of prompts for designating the service to which you will connect and specifying the search's target items or topics. The software then translates your selections into the appropriate logon sequences and commands, automatically connects to the designated service, and in some cases, performs the search and retrieves the information.

Such gateway systems are the first step in the development of natural-language components for communications. At present, gateways are more limited and less flexible than specially designed natural-language software such as Microrim's *Clout*, which allows you to ask a question or give a command in numerous ways—even with misspelled words—and still convey your meaning to the computer. Gateway systems and natural-language software have the same purpose, however; both are designed to demystify computer use by avoiding technical jargon and converting simple English words and phrases into the specific form required by a computer.

Gateway systems are the first step in the development of natural-language components for communications.

The three gateway systems discussed here are Business Computer Network (BCN) of Riverton, Wyoming; EasyNet, from Telebase Systems of Narberth, Pennsylvania; and *In-Search*, from Menlo Corporation of Santa Clara, California. Although the three

```
SS 1 /C?
USER:
photovoltaic or solar

PROG:
UNPROMPTED?/PROMPT?/CANCEL?  (U/P/C)

USER:
u

PROG:
SS 1 PSTG (21116)

SS 2 /C?
USER:
computer or IBM

PROG:
UNPROMPTED?/PROMPT?/CANCEL?  (U/P/C)

USER:
u

PROG:
SS 2 PSTG (59201)

SS 3 /C?
USER:
1 and 2


PROG:
UNPROMPTED?/PROMPT?/CANCEL?  (U/P/C)

USER:
u

PROG:
SS 3 PSTG (1732)
```

Screen 1: ORBIT commands and search results

systems vary in scope and applications, collectively they represent the unmistakable direction of communications software and services: ease of use, savings in time and cost, and one-stop shopping for a multiplicity of information sources.

Business Computer Network

BCN's major contributions to the communications process are cost savings and easy access to a varied group of information services and data bases.

BCN is the only one of the three gateway systems to combine access to commercial information services, such as CompuServe, and large-scale data base services, such as Dialog, NewsNet, BRS, and ORBIT. BCN also offers the greatest number of specialized data bases, including stock, bond, and commodity information services (from I. P. Sharp, MJK Commodities, and Security Data Services); the Billboard Information Network, an electronic version of *Billboard* magazine's "Hot 100" album list; sports and weather reports; and electronic mail via Western Union's EasyLink.

In late 1984 BCN was completing negotiations with several other major services, including The Source; Dow Jones News/Retrieval; Mead Data Central, which markets the Nexis and Lexis data bases; and the American Airlines on-line reservation system. Some or all of these services should now be available through this gateway system.

Obviously, variety is a chief benefit of BCN, but an even greater attraction is the potential savings in both cost and effort. Instead of having to open accounts and pay a one-time or monthly subscription fee (or both) to each member service, when you join BCN you receive the *SuperScout* communications program free (*SuperScout* is the only program that can be used to log on to BCN) and pay only a $5 monthly minimum fee. (This fee covers up to 20 logons to BCN per month; more than 20 logons in any month cost an additional 25 cents each.) The rates for use of each member service are the same hourly connect charges paid by direct subscribers to those services. BCN is able to offer those rates because it deals in large volumes of connect time and can therefore pay wholesale or volume rates to the member services. The amount of money that BCN subscribers save through bypassing the initiation fees of the individual services is often substantial.

```
AN  - SAND-80-2557/XAB
TI  - Analytical Models for Solar-Photovoltaic Energy-System
      Components.
CC  - 10B (ENERGY CONVERSION (NON-PROPULSIVE)--Power sources); 97N
      (ENERGY--Solar energy)
IT  - *Photovoltaic power supplies; *Solar cells; *Concentrator solar
      cells; *Power conditioning circuits; *Cooling towers; *Weather;
      *Computer codes; Mathematical models; Thermal analysis; Solar
      cell arrays; Electrical properties; Electric batteries; Cooling
      systems; Azimuth; Insolation; Algorithms; Heat exchangers; S
      codes; Fresnel lens; Solar concentrators; Computer calculations;
      ERDA/140600
```

Screen 2: One full ORBIT bibliographic citation

By joining BCN, you can test several on-line services for the cost of your connect time and then decide whether to establish individual accounts. You might want to open an individual account to receive the specialized training or volume-use discounts that some services offer their subscribers.

Using BCN

BCN is highly efficient as a gateway to its member services. You simply turn on your modem, load *SuperScout*, and answer some questions to configure the software for your system. You then provide the requisite credit card information and wait for it to be verified. Then you can connect with any member service by choosing its number from the *SuperScout* menu.

SuperScout provides standard communications features, but they are limited to use with BCN. For example, you can store up to nine phone numbers in the program's directory, then call and "chat" or exchange files with other computer users. The catch is that their computers must also use the BCN software.

When you call one of the BCN member services, the logon process is automatic after you select the member service from the *SuperScout* menu. Once your computer is connected to the service, though, you're on your own. That is, you must direct the information-retrieval process, using the proper commands for that service. Unfortunately, the *Database Guide* and the on-line help for the BCN system include only a scanty synopsis of commands and data bases available for each member service. Learning to search by trial and error can be a complex process, and you will be paying the service's per-hour connect charges while consulting the BCN manual and typing the commands in the right format. Thus, as with all commercial on-line systems, it is better to study the individual service's documentation and prepare a search strategy and a list of search commands before connecting to the service.

Once you've logged on to a member service—ORBIT for example—BCN and *SuperScout* are transparent. Screen 1 shows the last part of a sequence of commands in the ORBIT format and the results of searching for the terms *photovoltaic* OR *solar* and *computer* OR *IBM*. The object of this data base search was to locate information about the use of IBM PCs and other computers in solar energy applications. These same search terms were used with each of the three gateway systems.

By joining BCN, you can test several on-line services.

As the line 'SS 1 PSTG (21116)' in Screen 1 shows, ORBIT located more than 20,000 references to computers and solar energy; Screen 2 shows a bibliographic citation containing the terms *photovoltaic* and *computer*. It's clear that the search located the requested information, but unless you are familiar with ORBIT's commands and formats, you are left guessing what all the other codes on the screen mean. The BCN manual is not sufficiently helpful in this regard; nor does it explain how to quickly log off (<Esc>-E).

Despite its weaknesses, BCN serves a useful purpose in providing economical and simple access to a variety of information sources. Although this gateway system supplies the software and takes you in the door to each service, so to speak, you're on your own from that point forward.

EasyNet

EasyNet enables you to connect to many of the same data base services available through BCN, but in addition it puts your requests and search topics into the proper format for each service. EasyNet can be cheaper than using many of the data base services directly or going through BCN. Making cost comparisons between these gateway systems is not easy, however, because EasyNet does not charge according to connect time.

Instead, this system charges $6 for each logon to its computer (through a toll-free number), plus $6 for each basic search, which will locate either ten bibliographic citations or 500 lines of full-text records. If a search yields more than ten citations or 500 lines, you pay another $6 for the next similar batch of data. On the other hand, if a search yields no citations, you won't be charged for that search. In addition, EasyNet charges $2 to display the abstract of each item located in a search; the basic $6 search gives you the citation (author, title, source of publication, and date) without the abstract. You can order reprints of entire articles by mail ($8.50 each) or by overnight delivery ($17.50 each).

EasyNet has streamlined the data base selection process for inexperienced on-line searchers.

The EasyNet system can save you an appreciable amount of money if you make a highly specific search in an expensive data base (some cost up to $300 per hour). But if your search yields a large number of items (especially citations, at $6 for every ten), and you display numerous abstracts, using EasyNet is likely to be more costly than using BCN or connecting with a service directly.

As of January, EasyNet offered seven major data base services: Dialog, BRS, ORBIT, Infoline, Prestel, Vu/Text, and NewsNet. Three additional services should be on line by now: Wilsonline, the Oklahoma Data newspaper data base, and the I. P. Sharp financial data base. All are sophisticated data collections that use complex commands, so EasyNet's converting your search topics into the correct formats is particularly useful. Unlike BCN, EasyNet does not offer any of the consumer-oriented information services, such as CompuServe and The Source, and you need your own communications program.

Using EasyNet

EasyNet was designed with novice communications users in mind. Its on-screen messages are clear, and the system progresses through a logical series of menus. At most points, you can obtain on-line help, including sample commands, by typing **H**.

In addition to offering a comprehensible interface, EasyNet has streamlined the data base selection process for inexperienced on-line searchers. One of the three main EasyNet components features automatic data base selection. Once you narrow the focus of your search by choosing a topic from a series of menus and entering the specific search terms, EasyNet determines the most appropriate service and automatically connects to that source. If more than one member service offers the data base that EasyNet has selected, the system rotates its calls among the several vendors.

The two other components of EasyNet's service enable you to select the data base to be searched. One includes the same menu-assisted searching as the automatic selection component, and the other allows "native" command searching, which is a faster method for people who are experienced in using a particular service's commands.

Like BCN, EasyNet requires that you supply credit card information before you can begin using the system. One annoying feature of EasyNet's logon routine is that you must supply this information each time, whereas BCN's dedicated software stores the

information and automatically verifies it when you log on. This repetitious credit check appears to be the only flaw in a good system, however.

Screen 3 shows the search process, the report of its results, and the display of several citations. Easy-Net provides simple menus or questions at each point in the information-retrieval process, and it eliminates the mystifying codes or prompts of individual member services. Even logging off the system is easy—simply type **L**.

In-Search

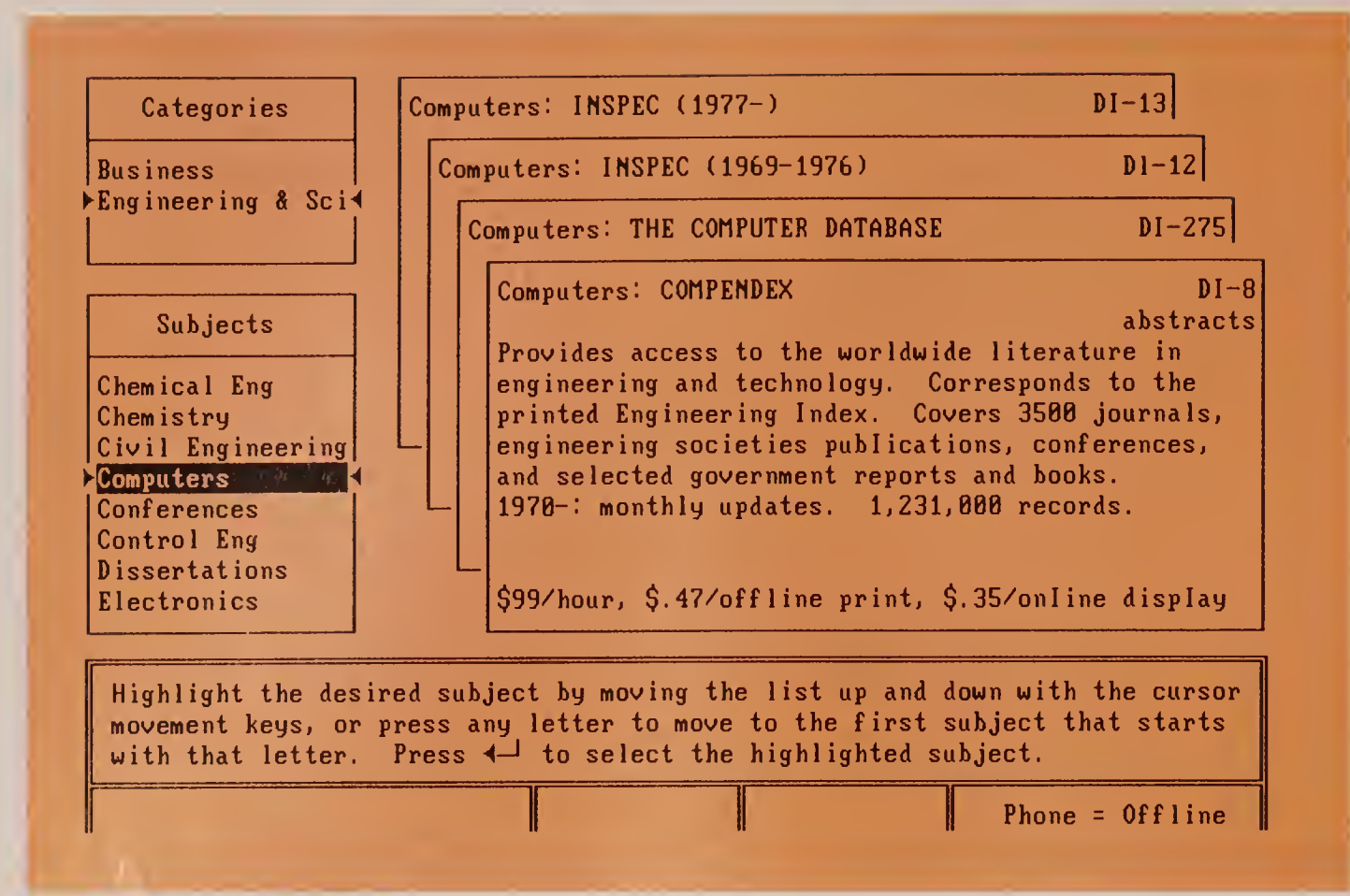
The third gateway system is the most narrowly focused and the most elegant. *In-Search* is a stand-alone software product that provides a bridge between your computer and Dialog mainframes. Dialog is the largest on-line service, offering more than 200 individual data bases. *In-Search* allows you to enter the topics and terms for your on-line search before connecting to the service.

Using *In-Search* can result in significant savings over the cost of direct Dialog searching. The program does not involve any surcharges to Dialog costs; once you purchase *In-Search*, you pay only for the actual time that you are connected to Dialog. (You have a standard Dialog account and are billed directly by that firm.) The program operates at 1200 bps if your modem supports it, which also reduces costs because Dialog has no surcharge for 1200-bps connections.

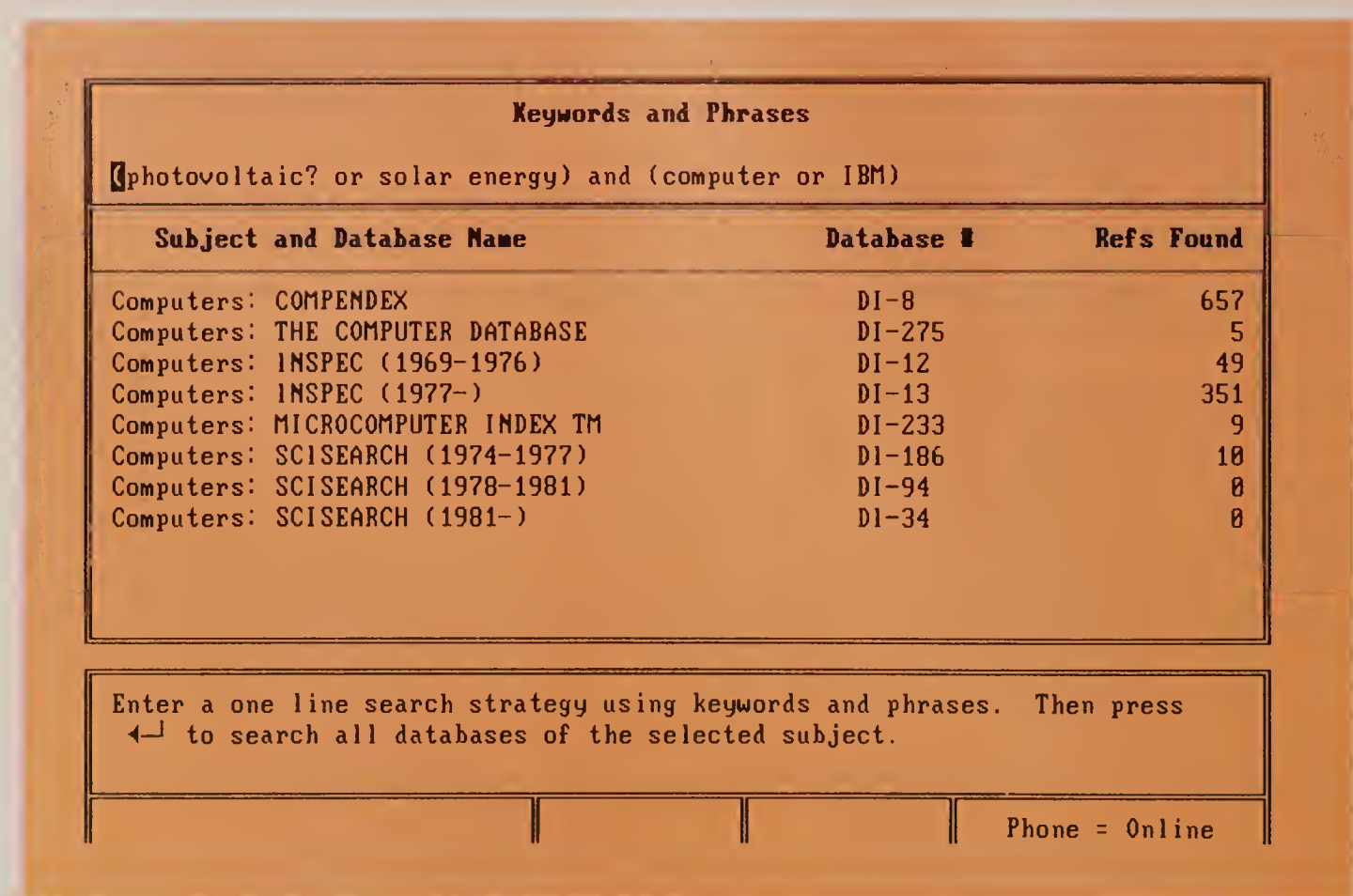
The program connects with Dialog only after you have entered one or more search commands, and you can easily break the connection by pressing <F5>. The program also offers a command that shows the charges you have incurred in a Dialog session. (You may want to use this command frequently, because it lists only the total since the most recent logon—and *In-Search* may log on and off several times during the search process.)

```
Dialing...(Standby).........Connected.
Completed.
Submitting Password.........Completed.
Selecting Database..........Completed.

Each star equals one line
of retrieved data. This may take
several minutes...
*****************************************
Search completed............
Press (return) to see
your search results...->

Title # 1
You may stop this display with control c
1/3/1
131878   ICD84B0052
   Tackling the Building Environment.
   Kelly, N.W.; Clerke, C.M.
   InCider  Vol.2, No.2, Feb. 1984, P. 52-54.

Title # 2
1/3/2
131876   ICD84B0042
   A Solar Survey.
   Brennan, T.
   InCider  Vol.2, No.2, Feb. 1984, P. 42-43.

Title # 3
1/3/3
131875   ICD84B0034
   The Solar Connection.
   Smith, B.
   New Alchemy, 237 Hatchville Road, East Falmouth, MA, 02536
   InCider  Vol.2, No.2, Feb. 1984, P. 34-40. 6 Pages.
```

Screen 3: An EasyNet search is initiated and the summary results reported before the citations are displayed.



Screen 4: In-Search category and subject selection and data base description



Screen 5: In-Search results of Master Index search. The number of items located by each search is displayed in the right-hand column.

In-Search's greatest strength is its handsome screen displays and impressively thorough documentation. A comprehensive tutorial is on disk and in the manual; four additional "category disks" include synopses of all Dialog data bases. Menlo Corporation plans to offer updates to the category disks as a file on Dialog itself, thus providing almost instant response to system changes.

Using In-Search

In-Search truly shines when you want to choose a search topic, determine the appropriate Dialog data bases to search, or devise search terms and phrases. The program divides the computer's screen into four windows, which display major subject categories, subtopics in the chosen category, summaries of data bases in the subcategory, and instructions (see Screen 4). The bottom line of the screen is used to display the status of certain key operations, such as whether the phone is on or off line and what percentage of disk storage space has been used for files.

To execute most of the program's commands, you select an option from a menu by moving the cursor to it or pressing the letter indicated for that command (in some instances, in conjunction with <F9>, the command key).

Once you have chosen a subcategory (such as *computers* in Screen 4), you can use the *In-Search* Master Index command to determine how many references to your topic are contained in each data base in that subcategory. Screen 5 shows the search phrase (at the top), the data bases searched, and the results of that search. This feature utilizes Dialog's Dial-Index, which reports the number of items meeting the search criteria in a group of data bases. When you have chosen a specific data base (with or without using the index feature), you enter the search terms on a well-designed search-keywords-and-phrases screen. If you have previously searched the index, you may still be on line to Dialog, and *In-Search* will send your first search term or phrase directly to Dialog. As you enter other search terms or phrases, the program sends them to the service, so that searching is continuous. If you are not connected to Dialog, you can enter all of the search terms and phrases, then direct the program to call Dialog and begin the search.

Once the search is complete, you can easily display selected records, designated by set, number, and format. The program scrolls each record in sequence through a large window, and you can pause the scrolling by pressing <F3>. When searching or retrieving records, you can also save all the data on disk or send it to the printer by pressing the appropriate function key. *In-Search* comes with a function key template to simplify the use of these command keys.

In-Search is a pleasure to use and a superb example of a gateway system. Although its focus has initially been limited to the Dialog data bases, versions of the program may soon be available for other major services, such as Mead Data Central's Nexis and Lexis. The program can save time and money for novice Dialog users and for experienced on-line searchers; it is a model of excellent software design and operation.

Table 1: Strengths and weaknesses of gateway systems

	BCN	EasyNet	In-Search
Variety of member services	Excellent	Good	Limited
Cost savings	Good	Fair	Good
Ease of use	Fair	Excellent	Excellent
Documentation	Poor	Fair	Excellent
Speed	Fair	Good	Excellent
Efficiency	Excellent	Good	Excellent

Apples and Oranges

The three gateway systems—BCN, EasyNet, and *In-Search*—share some features but are not directly comparable. Still, some conclusions can be drawn regarding their usefulness and their strong and weak points; these are summarized in Table 1. Table 2 shows the time required for the *solar energy/computer* search conducted on all three systems and selected other results of the test. *In-Search* performed most speedily, followed by EasyNet, and then BCN.

The three systems rank in the same order for ease of use. *In-Search* surpasses the other systems in documentation, on-line elegance, and applied usefulness, even though it operates with only one data base service. EasyNet maintains an acceptable balance between ease of use and sophistication of features, but it cannot compare with *In-Search*. Of

Table 2: Comparative search times for three gateway systems

	BCN	EasyNet	In-Search
Modem speed	300 bps*	300 bps*	1200 bps
Data base searched	ORBIT—Nat'l Tech. Info. Serv.	Dialog—Computer Database	Dialog—Compendex
Time to connect to service and search (minutes:seconds)	6:42**	1:43	1:10
Time to display one record	0:23	0:16	0:12
Time to search Master Index	NA	NA	1:03

* 1200-bps service was not available when these searches were performed.
** Some delay was caused by unfamiliarity with the service's commands.

course, EasyNet offers a greater variety of services to search, which is its clear advantage over *In-Search*. BCN is highly efficient at logging on to a variety of services, and it alone offers general-interest information services such as CompuServe, but it is lacking in on-line assistance and conversion of search commands into the needed formats for its member services. All three systems offer telephone support, and EasyNet promises to provide on-line consulting in real time as well.

At present, each of the systems fills a niche in the communications market. *In-Search* is invaluable if you are already a Dialog user or if you know that you will be using Dialog extensively. EasyNet is appropriate if you want to sample a variety of data base services or you do not need to use any one service extensively. BCN effectively reduces the costs of establishing and maintaining a number of data base accounts. Clearly *In-Search* comes closest to fulfilling its objectives perfectly, but all three systems are helping to make communications a simpler, and ultimately routine, process.

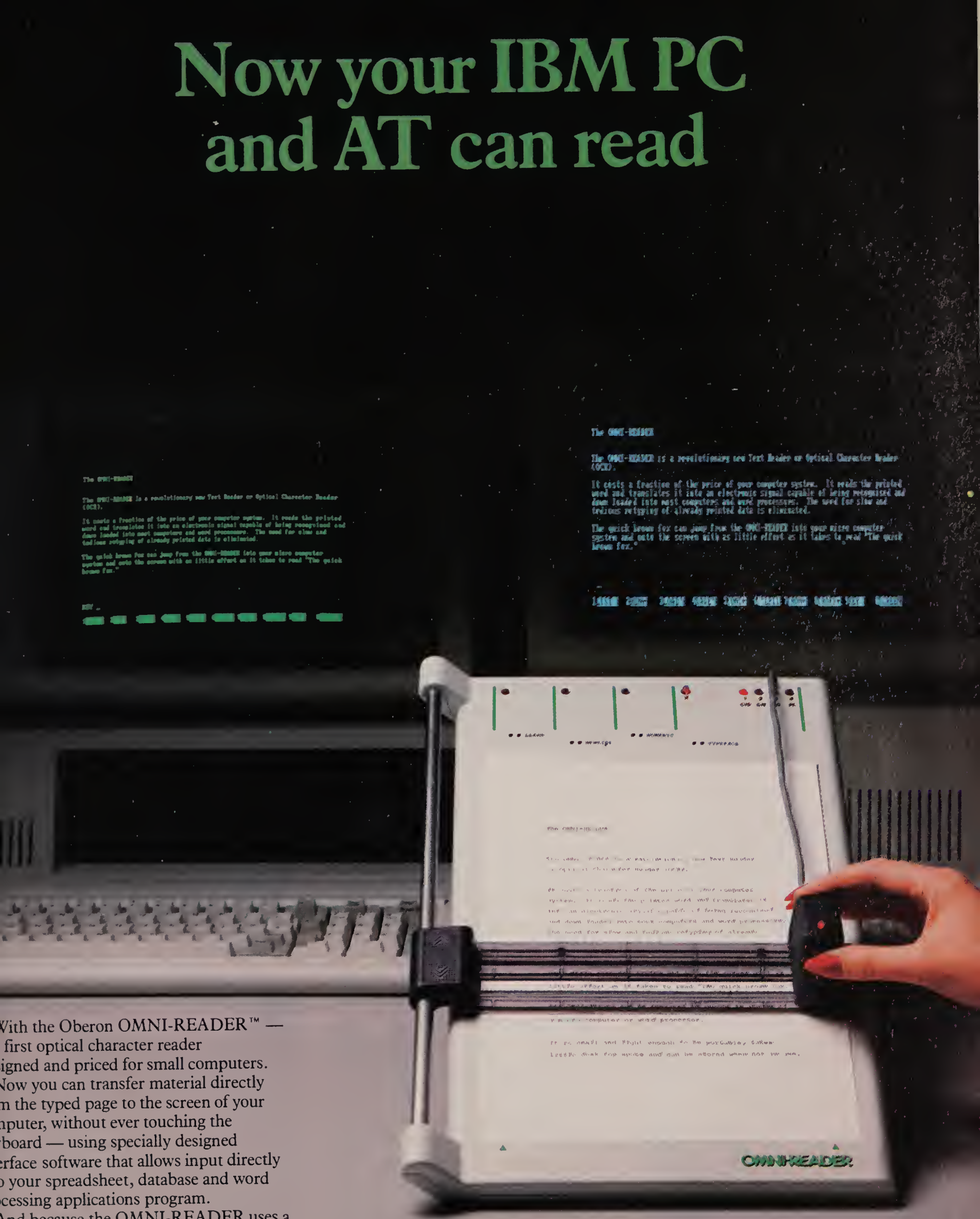
Jeremy Joan Hewes is a Contributing Editor to PC World *and the coauthor of* Writing in the Computer Age *(Doubleday, New York, 1983). She is currently at work on a new book about computer software for writers.*

Business Computer Network
P.O. Box 37
716 College View Dr.
Technical Research Park
Riverton, WY 82501
800/446-6255, 800/442-0982
Wyoming, 307/857-3722
Requirements: Hayes-compatible modem

EasyNet
Telebase Systems, Inc.
134 N. Narberth Ave.
Narberth, PA 19072
800/327-9638 (modem only),
215/664-6168 (voice)

In-Search
Menlo Corp.
4633 Old Ironsides Dr. #400
Santa Clara, CA 95050
800/221-4237, 800/221-9029
California, 408/986-1200
Requirements: Hayes-compatible or Novation Smart-Cat modem
List price: $399

Now your IBM PC and AT can read



With the Oberon OMNI-READER™ —
first optical character reader
igned and priced for small computers.
Now you can transfer material directly
m the typed page to the screen of your
nputer, without ever touching the
board — using specially designed
erface software that allows input directly
o your spreadsheet, database and word
cessing applications program.
And because the OMNI-READER uses a
ndard RS232 serial port hookup, it interfaces
ily with *your* computer.
The technology is revolutionary. But what is
st revolutionary is the price — under $500. IBM interface
tware, $50.
Find out more about the Oberon OMNI-
ADER. Dial 800-2-OBERON. In Texas, (214) 446-9567.

is a registered trademark of International Business Machines.

Circle 958 on reader service card

OBERON
INTERNATIONAL

Visit Oberon at Comdex Booth #1760.

DG/One for the Road

Looking for a PC-compatible laptop? The Data General/One is the closest yet to a pint-size, portable PC. Its full functionality comes at a full-size price.

Merrily Shinyeda

Portable computing has never been painless. A truly portable "laptop" machine such as the battery-powered, 3.9-pound Radio Shack Model 100, which costs $599, is so limited by its 24K of memory that it has found a solid niche only among word processing journalists. A marginally portable "suitcase" machine like the 30-pound Compaq offers the power of a PC for $2255 but is so cumbersome that it gets dragged off a desk top only when absolutely necessary. Even then, it must always find its way to an AC outlet.

Not surprisingly, many manufacturers—among them Morrow, Hewlett-Packard, GRiD, and Sharp—are hustling to market with what they claim are truly portable PC-compatible laptops. It's not an easy bill to fill: Stuffing the power of an 8088, a disk drive, a full-size screen, a keyboard, a modem, and a battery into a 9- or 10-pound package is understandably difficult. The best so far—with reservations, one of them being the big bite the machine takes out of your wallet—is the Data General/One from Data General. It packs more PC compatibility per square inch than any of its competitors.

The DG/One is a 9-pound briefcase-size portable with 128K that operates under MS-DOS and runs PC software. Its low-power CMOS (complementary metal oxide semiconductor) version of the PC's 8088 microprocessor sets the stage for PC compatibility. At $2895, the DG/One provides a large, 80-character by 25-line display; one double-sided 3½-inch internal floppy disk drive; and a 79-key keyboard complete with cursor controls, function keys, and an integrated numeric keypad. Two serial ports provide RS-232C and RS-422 compatibility. Extra-cost options include dealer-installed 128K increments of CMOS RAM that boost the DG/One's memory to as much as 512K; a second 3½-inch drive; 300-bps internal and 1200-bps external modems; and a 2-pound rechargeable battery pack that supplies the system with power for up to 10 hours. Also available is an external 5¼-inch floppy disk drive that allows you to transfer programs to and from a PC. Bundled with the computer are MS-DOS, DOS utilities, a text editor, and a communications program.

A Dubious Display

The DG/One's flip-up liquid crystal display (LCD) provides a 10-inch diagonal picture that offers the same size viewing area as a PC's 12-inch monitor. It displays 640 by 256 pixels, 25 lines, and large, well-formed characters in a two-to-one ratio similar to the characters of desktop displays. The DG/One's bit-mapped graph-

ics form crisp images without the distortion common to small screens. The computer even runs programs that feature animation, a rare capability in a portable computer.

Unfortunately, reading the DG/One screen can be exceedingly difficult. When open, the screen is fixed at a 114-degree angle, appropriate only for a typing table. If the DG/One is on your lap, a conference table, or an airline tray, or if lighting conditions are less than ideal, you will find yourself moving about trying to bring fuzzy letters into focus. That is a severe limitation in a machine expected to operate anywhere under variable conditions.

As this evaluation was under way, Data General retrofitted all DG/One displays with a polarized lens that fits flush against the screen, unlike the original lens, which protruded slightly. Eliminating space between the screen and the lens improves the screen's readability.

The 79-key keyboard has a standard QWERTY layout with the <Enter> and <Shift> keys in familiar, typewriter-style locations. Although the keys are slightly smaller than those on traditional keyboards, the keyboard has an exceptionally nice feel for a portable. Ten function keys, plus <Ins>, <Del>, <NumLock>, <ScrollLock>, and <PrtSc>, occupy the top row, while cursor controls are found in a row to the right of the <Space> bar.

A Drive for Every Occasion

The DG/One's PC compatibility is furthered by a clumsy but workable combination of up to three disk drives. The standard

internal 720K double-sided 3½-inch disk drive can be supplemented with a second internal 3½-inch drive as well as an external 5¼-inch drive. A second drive is necessary for most business computing. At least 90 business application software programs are available on 3½-inch microfloppies, including *1-2-3*, *dBASE II*, *Multiplan*, *WordStar*, and the *pfs:* series.

The $895 external 5¼-inch drive allows you to transfer data and non-copy-protected PC programs directly to DG/One's internal drives. For PC users who have already invested in 5¼-inch versions of these programs or who want to share PC data with their DG/One, the 5¼-inch disk drive is essential. Programs can be loaded into the DG/One and data files transferred using a simple DOS COPY command.

Convertible and Compatible

How compatible is the DG/One with the PC? Very. Its disk drives, full-size display, Intel 80C88 CPU, and MS-DOS operating system assure both program and media compatibility. In short, you can run more off-the-shelf PC software on the DG/One than on any other laptop computer. We successfully ran *1-2-3*, *ThinkTank*, and *Multiplan* on 3½-inch microfloppies, and successfully ran versions of *1-2-3*, *SammaWord II*, and *Flight Simulator* on 5¼-inch media.

A full 48K of the DG/One's 128K RAM is reserved for screen graphics, leaving only 80K for program and data handling. Since few business programs run on less than 128K, 80K of usable memory is clearly inadequate. Dealer-installed 128K increments—at $599 each—can bring total system memory up to a sizable 512K. Keep in mind, however, that 48K must be subtracted from total memory—a "256K" DG/One actually provides only 208K of usable memory.

VapidWare

DG/One's 32K read-only memory (ROM) contains self-testing diagnostics and primitive text editing and terminal emulation programs. The text editor, Notebook, can be used to create simple documents of up to 500 lines that can be printed or transmitted to a host computer. It offers no word wrap capability; a beep reminds you to press <Enter> at the end of each line to avoid losing text. Although you can insert text, characters are lost if they reach the end of the 80-character line. You can delete characters and copy single lines, but reformatting must be done line by line. Since text is stored in RAM rather than on disk, it is erased if you turn the system off. Clearly, Notebook is not intended to compete with disk-based word processing programs.

Communicating on the Run

The DG/One can be equipped with an internal 300-bps Bell 103A-compatible modem ($300) or an external 1200-bps modem ($699). The DG/One's ROM-based communications program emulates a standard teletype interface for gathering information from data bases such as Dow Jones and The Source, or it can emulate a Data General Dasher D210 terminal to communicate with Data General's Desktop Generation multiuser microcomputer or Eclipse minicomputer.

Not ready for the total switch to 3½-inch microfloppies? The DG/One's external 5¼-inch floppy disk drive enables you to pop in—and use—familiar DOS-formatted program and data disks.

In terminal mode Notebook can transmit commands to a Data General host computer or capture incoming data into a buffer. Data contained in this 500-line buffer can be edited and sent back to the host without leaving terminal mode. Unfortunately, since you cannot save or send disk files with Notebook, captured data must be printed or written to a file on a host system.

Finding a standard communications program to avoid Notebook's shortfalls is not easy. As a general rule, communications programs written for the IBM PC address its 8250 communications chip directly. With no CMOS version of the 8250 available, Data General was forced to use an obscure chip that severely limits the number of communications packages available for the DG/One; the

only completely compatible program is Communications Research Group's *Blast*. A DG/One equipped with *Blast* can transfer documents to or from PCs, Data General computers, and a number of other systems.

For Data General Fans

For users of Data General's Eclipse MV/Family host computers, two software packages significantly extend the DG/One's capabilities. *CEO Connection* allows DG/One users to convert and transfer selected DOS word processing and spreadsheet documents to and from systems running *CEO* software. In addition, this program allows the DG/One to operate as a Data General Dasher D210 with access to powerful *CEO* software functions. The DG/One can send a document to an electronic in-box, update a calendar, and gain access to *CEO Word Processing* and *CEO Decision Base* software.

Many Data General minicomputer users have a sizable investment in application programs written in Data General's Interactive COBOL language. *MS-DOS Interactive COBOL Runtime* enables these customized applications to run on the DG/One under DOS without conversion or recompilation. This ability to download proprietary software to a portable computer opens up a wealth of opportunities for journalists, insurance agents, and outside sales and service staffs.

Charge It

When no AC power is available, the DG/One can operate off a $178 rechargeable nickel-cadmium battery pack. The battery pack fits into the rear of the system, adds 2 pounds to the unit's total weight, and provides up to 10 hours of operation if a single disk drive is not used more than 20 percent of the time. Unlike the HP 110, the DG/One gives no indication of the amount of battery life remaining, so if the power-hungry drives are used extensively, you may receive a prompt that reads 'low battery'—at least that's what the manual claims. When I exhausted the battery's power, however, I did not receive this courtesy or the opportunity to store my text file. The screen flickered, the machine beeped, and the system promptly died.

If you happen to be working where AC power is available, you can plug in the AC adapter and resume work while the batteries are recharging. Since it is impossible to tell how much power remains in the battery, the battery charger should accompany the DG/One at all times. The battery charger, AC power adapter, power cords, and modem cables fit neatly in the $149 hard carrying case along with the DG/One and its printer.

How compatible is the DG/One with the PC? Very. Its disk drives, full-size display, Intel 80C88 CPU, and MS-DOS operating system assure both program and media compatibility.

Moveable Type

The DG/One's compact $525 thermal printer is light enough to sit on top of the computer. The 4-pound unit prints 20 to 40 characters per second, depending on whether it is producing near letter quality or draft printouts. It prints compressed or elongated copy as well as graphics, connects to one of the DG/One's two serial ports, and is powered by the AC adapter or its own nickel-cadmium battery pack. Thermal-sensitive roll paper produces the best results; however, you can use individual cut sheets if you install a thermal transfer ribbon.

Costly Things in Small Packages

Buying a DG/One is like buying a Ford: its base price is reasonable, but by the time you add enough options to bring the machine up to the desired level of performance, you've laid out quite a bit of cash. Take the basic $2895 128K DG/One with one disk drive and add a second internal disk drive ($599), an additional 128K memory ($599), a 300-bps internal modem ($300), and a rechargeable battery

DeskSet™

1985 Reviewers' Choice
for the IBM PC, XT, AT, Jr, 3270 PC and compatibles

Bellsoft has taken the Sidekick idea a step further. -- **InfoWorld 1/85**

Much better than the competition (know anyone who wants to buy a Sidekick?) -- **Cummins (Fortune #216)**

Best of all, the Bellsoft Pop-Up PopDOS is an almost necessary addition to the operating system. -- **Business Software 1/85**

When it comes to overall ease of use and efficiency, Bellsoft's DeskSet Plus is probably the winner... -- **New York Times 2/85**

This is an Excellent Package. Thanks. -- **J. Bondurant, ComputerLand Corporate Headquarters**

$69.95 Not copy-protected!
$129.95 with TeleComm for the PC and XT

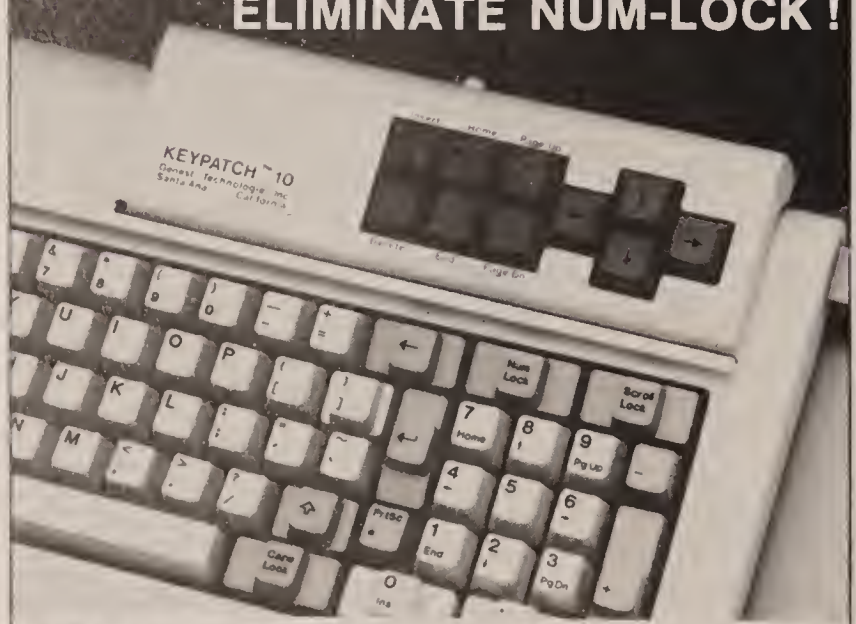
Available at hundreds of computer stores, or call
1-800-44-POPUP

2820 Northup Way
Bellevue, Washington 98004
206-828-7282

BELLSOFT

Circle 230 on reader service card

ALL IBM PC & XT USERS . . . ELIMINATE NUM-LOCK !



KEY-PATCH™ - A full travel mini-keyboard. Plug it in. It automatically locks your IBM keyboard into NUM-LOCK and places all control function keys conveniently at your fingertips without pressing NUM-LOCK.
KEY-PATCH™ plugs into your keyboard in minutes; requires no software. A must for spread-sheets; word processing; etc.

For Immediate Shipment

ONLY $84.95

Genest Technologies, Inc.
1331 E. Edinger Ave.
Santa Ana, Calif. 92705
(714) 547-0880

Plus $2.50 Shipping
(Cal. Res Add 6% Sales Tax)
Visa; Master Card;
Check; Money Order

™ Patent Pending

Circle 78 on reader service card

pack ($178), and you've just spent $4571. Consider adding the external 5¼-inch disk drive ($895) or a 1200-bps external modem ($699), and you'd better absolutely, positively want a PC-compatible whose big advantage is its small size.

For those to whom PC compatibility and battery-powered portability are critical, the DG/One, even with its problems, is *the* one. Mobile professionals, such as salespeople and site engineers, will argue that $4571 is an acceptable price to pay to have important data at their fingertips, to be able to perform in-the-field analyses, and to maintain on-line access away from the office. Pint-size and nearly painless, the DG/One may prove to be as handy a travel companion as your alarm clock or your little black book.

Merrily Shinyeda is a Contributing Editor for PC World.

Data General/One
Data General Corp.
4400 Computer Dr.
Westboro, MA 01580
800/328-2436, 617/366-8911
List price: $2895, second 3½-inch disk drive $599, external 5¼-inch disk drive $895, 128K RAM increments $599 each, battery pack and recharger $178, thermal printer with battery $525, 300-bps internal modem $300, 1200-bps external modem $699, soft carrying case $99, hard carrying case $149

Introducing everything you've missed in a printer under $500.

The new MT 85 and MT 86 are a far cry from anything you've ever printed with before. Pick any program. Like Lotus 1-2-3,™ if it runs on IBM® and compatible PCs, it will also drive the MT 85 and MT 86.

The faster, quieter, 100% compatible, multi-typestyle printers from Mannesmann Tally.

With our plug-in cartridges, you choose your favorite typeface. Like Courier, the most popular office typestyle used in business today. Or Letter Gothic, the ideal look for data.

Ultra-fine correspondence quality comes standard. It costs extra on Epson.® And isn't even available on some.

The new Tally printers are so quick and quiet, you can hear a pin drop at 180 characters per second. They're also the perfect size, needing little more space than your average in-basket.

Draw your own conclusions.

MANNESMANN TALLY MT 85/86	EPSON FX-80/100	OKIDATA MICROLINE 92/93
SPEED		
180 cps	160 cps	160 cps
CORRESPONDENCE QUALITY		
Standard	Optional	Standard
TYPESTYLE CARTRIDGES		
Yes	No	No
MODULAR INTERFACE		
Yes	No	No

Visit your Mannesmann Tally dealer for a demonstration of the most exciting new printers you can get for the money.

Or for literature and where-to-buy information, call us toll free at 1-800-447-4700.

And see what you've been missing.

MANNESMANN TALLY

COMDEX See us at booth 340.

IBM and Epson are registered trademarks of International Business Machines Corp., and Epson Corp. Lotus 1-2-3 is a trademark of Lotus Development Corp

Circle 117 on reader service card

Applied Computer Products, Inc.

SPECIALS

CONTROL DATA
Full Size 360K DS/DD . . . . . $ 129*
*"The drive IBM trusted with its logo"

TEAC
Half-Height 320K DS/DD . . . $ 129
"The #1 Rated Half-Height Drive"

64K RAM Chips
200ns Pre-Tested . . . . . Best Price

AST SIXPACK w/384K . . . . . Best Price

MAYNARD ELECTRONICS
10MB HARD Internal Hard Disk . $ 799
with Tape Backup . . . . . $ 1648
30 MB Internal Hard Disk $2177
These Hard Disks can be easily installed in your PC in no time at all.

MULTIMATE w/80K Word Speller . . . . . $ 279

EASYWRITER II/SPELLER/ MAILER . . . . . $ 195

HARDWARE

COMPUTER SYSTEMS

IBM
PC w/256K 2-360K Floppy Drives . . . . $ Call
PC w/256K 1-360K Floppy, 1-10mb Hard Disk . . . . . $ Call
AT w/256K 1-1.2MB Floppy Drive
AT w/512K 1-1.2MB Floppy, 1-20MB Hard Disk . . . . . $ Call
PC/XT w/128K 1-360K Floppy, 1 10MB Hard Disk . . . . . $ Call

COMPAQ
w/256K 2-360K Floppy Drives . . . . . $ Call
w/256K 1-360K, Floppy, 1-10MB Hard Disk

All computer systems are configured to fit your individual needs. Each system is fully assembled and tested to ensure that all parts are in working order.

COMMUNICATION PRODUCTS

HAYES
Smartmodem 300 . . . . . Call
Smartmodem 1200 . . . . . $ 425
Smartmodem 1200B w/Smartcom II . . $ 385

TAC
Irma (Emulates 3278 Terminal) . . . . . $ Call
Irma Line (For Remote Emulation) . . . $ Call

We carry a wide variety of Mainframe Communication and Local Area Networks. For advice about which will suit your needs best give us a call and let us review them with you.

FLOPPY & HARD DISK DRIVES

ALLOY (Ideal for networks)
20-170MB Hard Disks w/Tape Backup . $ Call

CONTROL DATA
Full Size 320K DS/DD . . . . . $ 129
Half-Height 320K DS/DD w/Bracket . . . $ 129

I-OMEGA (Bernoulli Box)
(10-20MB) Removable Hard Disks . . . . $ Call

MAYNARD ELECTRONICS
10MB Hard Disk WS-1 (XT Lookalike) . . $ 899
10MB Hard Disk WS-2 (XT Lookalike) . . $1049

SYSGEN
Image Backup (For XT or Maynard) . . $ Call

TALLGRASS
20—70 MB Hard Disk w/Tape Backup . . $ Call

TANDON
TM100-2 360K DS/DD . . . . . $ 139

TEAC
Half-Height 320K DS/DD w/Bracket . . . $ 129
Half-Height 640K DS/DD w/Bracket . . . $ 179

DISKETTES

MAXELL
MD2HD DS/Quad Density for AT . . . . . $ 59

SCOTCH 3M
DS/DD Box of 10 . . . . . $ 25

VERBATIM
DS/DD Box of 10 . . . . . $ 29

DISK CONTROLLERS

MAYNARD ELECTRONICS
Standard Disk Controller . . . . . $ 115
with Parallel Port . . . . . $ 165
with Serial Port . . . . . $ 189
Sandstar Modular Disk Controller . . . . $ 199
All Sandstar Modular Options Avail. . . $ Call

EXPANSION BOARDS

MAYNARD ELECTRONICS
Modular Memory Brd. w/64K to 576K . $
Modular Multifunction Board . . . . . $

AST RESEARCH
(All AST boards include SuperDrive, SuperSp
and 1 year warranty)
SixPack Plus w/64K to 384K . . . . . $
MegaPlus II w/64K to 512K . . . . . $
Memory Board II w/64K to 384K . . . . . $
I/O Plus II . . . . . $
MegaPack w/128K or w/256K . . . . . $
Parallel, Serial, Game Options . . . . . $

ORCHID TECHNOLOGY
Blossom w/64K to 384K . . . . . $

TECMAR
Captain w/64K to 384K w/Software . . . $

QUADRAM
Quadboard w/64K to 384K . . . . . $

PRINTERS & PLOTTERS

EPSON
(All Printers include GRAPHTRAX-Plus)
RX-80 (120 cps, 80 cols) . . . . . $
RX-80 F/T (120 cps, 80 cols) . . . . . $
RX-100 F/T (100 cps, 132 cols) . . . . . $
FX-80 F/T (160 cps, 80 cols) . . . . . $
FX-100 F/T (160 cps, 132 cols) . . . . . $
JH-80 8 Color Printer (160 cps, 80 cols) . . . . . $
LQ-1500 Near Letter Quality (200 cps, 132 cols) . . . . . $
Epson-IBM Cable . . . . . $

HEWLETT PACKARD
HP—7470A Two Pen Plotter . . . . . $
HP—7475 Six Pen Plotter . . . . . $
LaserJet Prints 8 pages/min . . . . . $
ThinkJet Ink jet printer (80 cols) . . . . . $
HP-IBM Cable (works w/Lotus 1-2-3) . . $

NEC
NEC 3550 Letter Quality 35 cps $149
NEC 2050 Letter Quality 18 cps . . . . . $ 75
NEC 8850 55 cps $187
Bi-Directional Tractor . . . . . $ 23
Cut Sheet Feeder (Feeds 200 Sheets) . $ 29
NEC-IBM Cable . . . . . $

OKIDATA
Microline 83A (120 cps, 132 cols) . Best Pric
Microline 92 (160 cps, 80 cols) . . . Best Pric
Microline 93 (160 cps, 132 cols) . . Best Pric
Microline 84 (200 cps, 132 cols) . . Best Pric
Plug n' Play . . . . . Best Pric
Okidata-IBM Cable . . . . . $

We carry paper, accoustical enclosures, print buffers and switches. Call for specifications an prices.

• Systems • Service • Support at Competitive prices

To Corporate Buyers:

Our Company has been selling IBM Microcomputer equipment and software almost as long as IBM. We have a technical support staff available 60 Hrs/week to help you review product compatibility as well as solve any equipment or software problem you may encounter.

We offer Volume discounts and terms. Our consultants are waiting to serve you. So, Call Now!

MONITORS

MDEK
deo 300A Amber Screen ..... $ Call
deo 310A IBM Monochrome in Amber ..... $ 170

RINCETON GRAPHICS
ewest models HX—12E and SR—12P (Call for info and price)
X-12 RGB Hi Resolution Color ..... $ 479
ax-12 IBM Monochrome in Amber .. $ Call
R-12 Hi Resolution Color ..... $ Call

XAN 122 TTL in Amber ..... $ 159
ENITH 124 TTL in Amber ..... $ 149

VIDEO—MONITOR BOARDS

ERCULES	Graphics Card	$ 339
	Color Card	$ 179
ARADISE SYSTEMS	Multidisplay	$ 339
	Modular Graphics	$ 299
B	Graphix Plus	$ 299
UADRAM	Quadcolor I	$ 189
ECHMAR	Graphics Master	$ 479

ll for specifications and help in deciding which oard fits your needs.

MISCELLANEOUS

AM chips 64K Set ..... $ Best Price
087 or 80287 Co-processor ... $ Best Price
EYTRONIC Deluxe Keyboard (KB 5151) . $ Call
OUSE SYSTEMS—PC Mouse ..... $ Call
urge Suppressors ..... $ Call
ysticks ..... $ Call

SOFTWARE

LPHA
atabase Manager II ..... $ Best Price
lectric Desk ..... $ Best Price

SHTON TATE
Base II ..... $ 285
Base III ..... $ Call
ramework ..... $ Call

TI
ll Software Training Pkgs ..... $ Call

ORLAND INT'L
urbo Pascal ..... $ 45
idekick ..... $ 45

ENTRAL POINT SOFTWARE
opy II PC ..... $ 35

OX & GELLER
uickcode II or III ..... $ 169
Graph (Requires Graphics Card) .... $ Call
Util (Utilities for dBase II or III) ..... $ Call
uickreport (Report Generator, dBase II or III) .. $ 169

FUNK—Sideways ..... $ 39
HAYES—Smartcom II ..... $ 99
IMSI—4 Point Graphics (Rated #1) ... $ 59
(Inhance Lotus Graphics)

INDIVIDUAL SOFTWARE
Tutorial Set (IBM PC/XT and DOS) .... $ 69
Typing Instructor ..... $ 39

SORCIM/IUS
EasyWriter II System (See Specials) .. $ 195
Accounts Receivable ..... $ 299
Accounts Payable ..... $ 299
General Ledger ..... $ 299
Order Entry ..... $ 299
Inventory Control ..... $ 299
Payroll ..... $ 369
Supercalc III (Version 2) ..... $ 219

INFOCOM—Zork I, II, III ..... $ 29
All games available ..... $ Call

LATTICE
C—Compiler ..... $ 299
C—Food Smorgasboard (C—Library) . $ 110
Lattice Windows (Allows Windowing) . $ 225
Float 87 (8087 support) ..... $ 89
Panel (Screen Data Entry Aid) ..... $ 189
Halo (Color Graphics Utilities) ..... $ 125

LIFETREE
Volkswriter Deluxe w/TextMerge ..... $ 169

LOTUS DEVELOPMENT
Lotus 1-2-3 (Version 1A) ..... $ Call
Symphony ..... $ Call

MICRO DATA BASE SYSTEMS
Knowledgeman ..... $ Best Price
Kgraph ..... $ Best Price
Kpaint ..... $ Best Price
Ktext ..... $ Best Price

MICROSOFT
C-Compiler ..... $ 349
Flight Simulator ..... $ 32
Multiplan (New Version) ..... $ 129
Word ..... $ 239
Word w/Mouse ..... $ 299
Mouse w/Software ..... $ 139
Project ..... $ 159
Chart ..... $ 159

MICROPRO
Wordstar w/Tutorial on Disk ..... $ 195
Wordstar 2000 Newest Version ..... $ 269
Professional Plus ..... $ 329
Wordstar 2000 Plus ..... $ 329
Propack ..... $ 295

MICRORIM
R.base 4000 ..... $ 269
Clout ..... $ Call
Extended Report Writer ..... $ Call

MICROSTUF
Crosstalk XVI (for Hayes Smartmodem) ..... $ 99

MORGAN COMPUTING
Trace 86 (Assembly Language Debug) $ 89
Ted (Program Editor) ..... $ 69
Professional Basic (640K of workspace) $ 69
8087 & 80287 Support ..... $ 39

MULTIMATE INTERNATIONAL
Multimate (See Specials) ..... $ 279

PETER NORTON
Norton Utilities (Newest Version) ..... $ 65

ROSESOFT
Prokey (Newest Version) ..... $ 95

SCARBOROUGH SYSTEM
Master Type ..... $ 39

SOFTWARE PRODUCTS
Open Access ..... $ Call

SATELLITE SOFTWARE INTERNATIONAL
Word Perfect (includes Speller) ..... $ 250

SOFTWARE PUBLISHING
PFS/Access ..... $ 65
PFS/File ..... $ 89
PFS/Graph ..... $ 89
PFS/Report ..... $ 79
PFS/Write ..... $ 89

Our Policy

• We accept VISA, Mastercard, Money Orders, Certified Checks, Cashiers Checks, Personal Checks, Wired Funds • We do not charge your card until we ship • **No surcharge added on VISA and Mastercard** • Allow one week for personal and company checks to clear • COD maximum $500 Cash or Certified check on delivery • Please use local phone number for order status inquiries • Prices subject to change without notice • Returns may be subject to restocking fee.

SHIPPING (U.S.). For monitors, printers, and hard disk drives add 2% to all orders. Blue label and Next Day Air available. For all other items add $4. **Most orders shipped next day.**

APPLIED COMPUTER PRODUCTS INC.

1633 Republic Road, Huntingdon Valley, PA 19006
215-322-6500 Telex 756876 UD

1-800-223-3860

When you need competitive prices, prompt service and complete support, call us.

*IBM is a registered trademark of International Business Machines.

Circle 205 on reader service card

Keeping Murphy's Law at Bay

What can go wrong need not go wrong. Microsoft Project can help you run your project instead of letting your project run you.

Bill Dauphinais and Leonard Darnell

Murphy might not have been such a pessimist had he gotten his hands on a project management program such as *Microsoft Project*. Using *Project*, you define a project plan—an ordered series of tasks—and assign resources such as people, equipment, and facilities to each task. The program rewards your effort with an easy method of viewing, printing, and maintaining your project. It produces a Gantt chart, a time line that shows how project tasks interrelate, and a variety of handy reports documenting project status. You can adjust any part of your project, and the program will recalculate figures throughout.

Equally important, *Project* will determine your job's critical path—the sequence of activities that must be completed in a timely manner to prevent delays. *Project* is based on the Critical Path Method (CPM), a planning technique that focuses on minimizing the time needed to complete an entire project. A fundamental requirement of CPM is the ability to estimate accurately the time needed to perform each project task (see "Project Management: One Step at a Time," *PCW*, Vol. 2, No. 10).

Project cannot match the industrial-strength capacities of more expensive project management packages such as *Primavera, PMS-II*, or the many mainframe-based systems that engineers and planners have been using for years. However, *Project* is well suited to planning and managing projects that consist of 20 to 50 activities. For these relatively small jobs, such as the creation of a new company department, the sophistication of larger systems would translate into burdensome complexity. *Project* offers the essential features of project management: critical path scheduling, tracking interrelated tasks, automatic recalculation of time and costs, and production of easily understood graphics and an armload of assorted reports. Yet *Project* allows you to develop your first plan in an hour or two using a system with as little as 128K and one disk drive.

Getting Started

Install DOS on the system disk to make the program self-booting and then start *Project* by typing **PROJ**, or **PROJ** *filename* to call up a specific file. When you start *Project*, the Activity screen appears; from its menu you can call up *Project*'s Calendar and Resource screens. The program's method of selecting commands is similar to *Multiplan*'s: Either type the first letter of the command or move through the menu with the <Space> bar or <Tab> key and press <Enter> at the appropriate command.

Project reduces project organization to a three-step process: you set up a calendar, define activities on a schedule, and assign resources to each activity.

The Project Calendar

Project's Calendar screen (see Figure 1) lays out general project information: start and finish dates, workdays, and project duration. The Calendar screen's default mode sets weekdays as workdays and weekends as nonworkdays. You can designate nonstandard workweeks using the Workweek command and turn individual days "on" or "off" with the Edit command. A project can start in any year from 1900 through 2068 and can last a maximum of ten years.

Creating the Project Schedule

Once you establish a calendar, you are ready to define the project schedule and enter project activities by using the Activity screen, which appears when you first start *Project*.

Before you enter project activities, you need to define general schedule information. Use the Options command to establish the project start date and set the project time scale to days, weeks, or months. Weekly and monthly summaries are useful when you want a general view of a project or when you need a printout in a hurry. A serious *Project* drawback is its lack of an hourly time scale, an essential feature for projects in which costs are based on hourly rates. The smallest units *Project* allows are tenths of a day.

The Options menu allows you to specify foreground and background colors for use with a color system, set *Project*'s numerical recalculation function to automatic or manual, and selectively display slack time. (Slack time is flexible time associated with a noncritical activity whose start date can be changed without affecting the project completion date.)

Activities are entered on the Schedule screen with the Activity Edit command. An activity must be a discrete event with a given duration, have its own start and finish dates, and relate logically to other activities in the project. For each of up to 128 activities, you type in a description of up to 30 characters (though, annoyingly, only 15 characters will be displayed on screen), the activity's duration in days, its start date, and a list of any predecessor activities. (Predecessors are activities that must be completed before another activity can begin.)

The start date of an activity can be designated as a specific date or simply "ASAP." In the latter case the actual start date of each activity will depend on the predecessor/successor relationships you establish between the project activities. Up to eight predecessors can be specified for each activity. *Project* assigns each activity a unique number as you enter it; you indicate predecessors simply by referencing their number. When you add or delete activities, *Project* recalculates predecessor relationships to retain the proper order.

Once activities are entered, you can sort them in a number of ways to fashion the most meaningful presentation of the project schedule. A sort can be alphabetical, by start or finish date, by duration, or by critical activities. All activities or a specified range can be sorted in ascending or descending order.

The Activity screen displays the completed list of activities, the project schedule, a time scale, and the Activity menu (see Figure 2). Of a maximum 128 activities, 19 can be viewed at one time. (The time scale's numerals, stacked vertically, are extremely difficult to read.)

Assigning Resources

You can assign a maximum of 64 resources to each project and up to 8 resources to each activity (see Figure 3). Each resource is referenced with a description of up to 15 characters and can also have a specified capacity limit—the amount of that resource beyond which you cannot spend. For example, if the resource is an indi-

vidual who can devote 50 percent of his or her time to the project, his or her capacity would be .5.

As you work with the schedule, *Project* will warn you with an error message if a resource has been assigned beyond its capacity and will give you a chance to adjust resources or activities. Keep in mind that this capacity-limit feature is not the same as the resource-leveling capability found in other project-scheduling packages. Resource leveling adjusts activity duration based on the resource demands of each activity and the total resources available to the project; with *Project*, activity duration is fixed until you adjust it manually.

You assign each resource a daily, weekly, monthly, or fixed cost; *Project* calculates the cost of the resource for the total time it is used, prorating when necessary.

Once you establish a project's resources, you can allocate them to each activity with the Activity Edit command. Each resource can be allocated in days or tenths of days, such as .8 carpenters or 1.5 word processor operators.

Reports for Every Occasion

Project generates three activity reports and three resource reports that can be printed immediately, saved in a disk file for printing later, or modified by a text editor. Conspicuously absent is the ability to print information from the Calendar screen.

Report formats are defined by the program, and a report writer is not included. However, you can choose to print all or just a specified range of activities or resources in a report. This is useful when the recipient of the report needs only a portion of the information available.

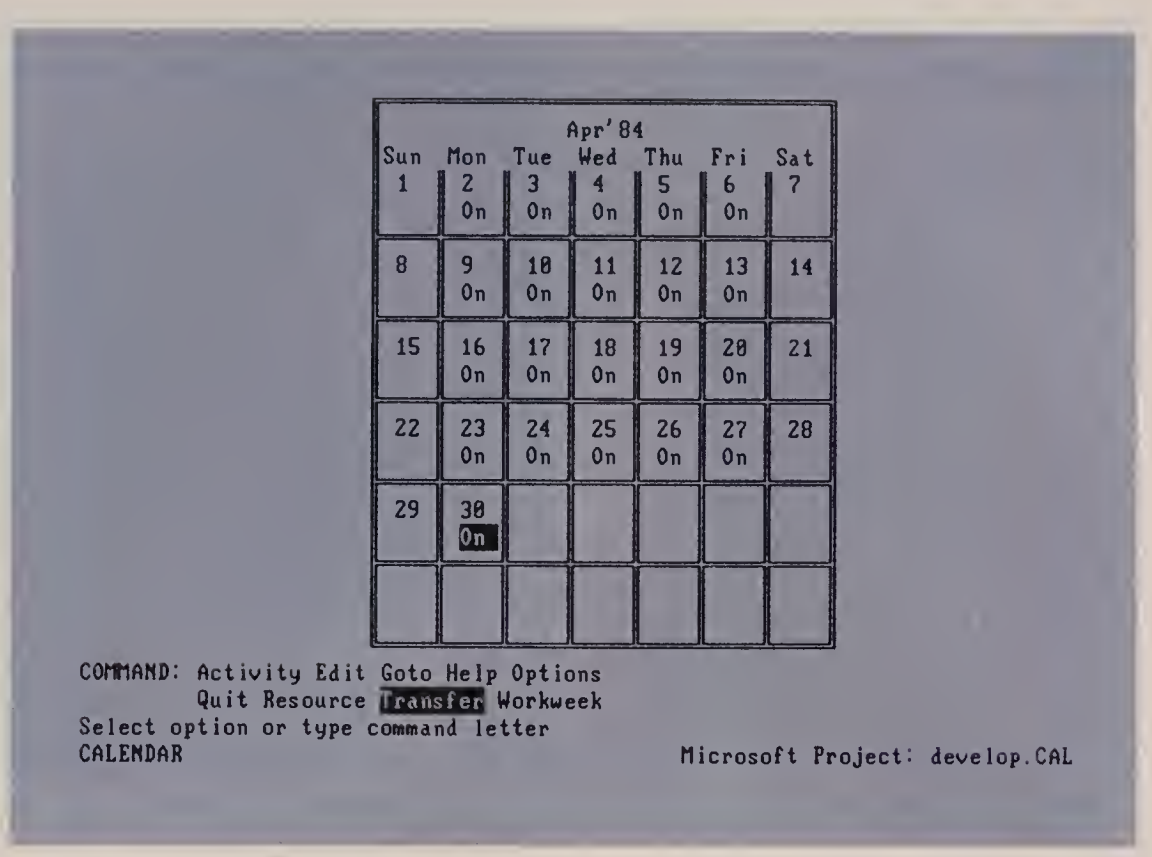


Figure 1: Calendar days can be turned "on" to indicate working days or left blank to indicate non-workdays.

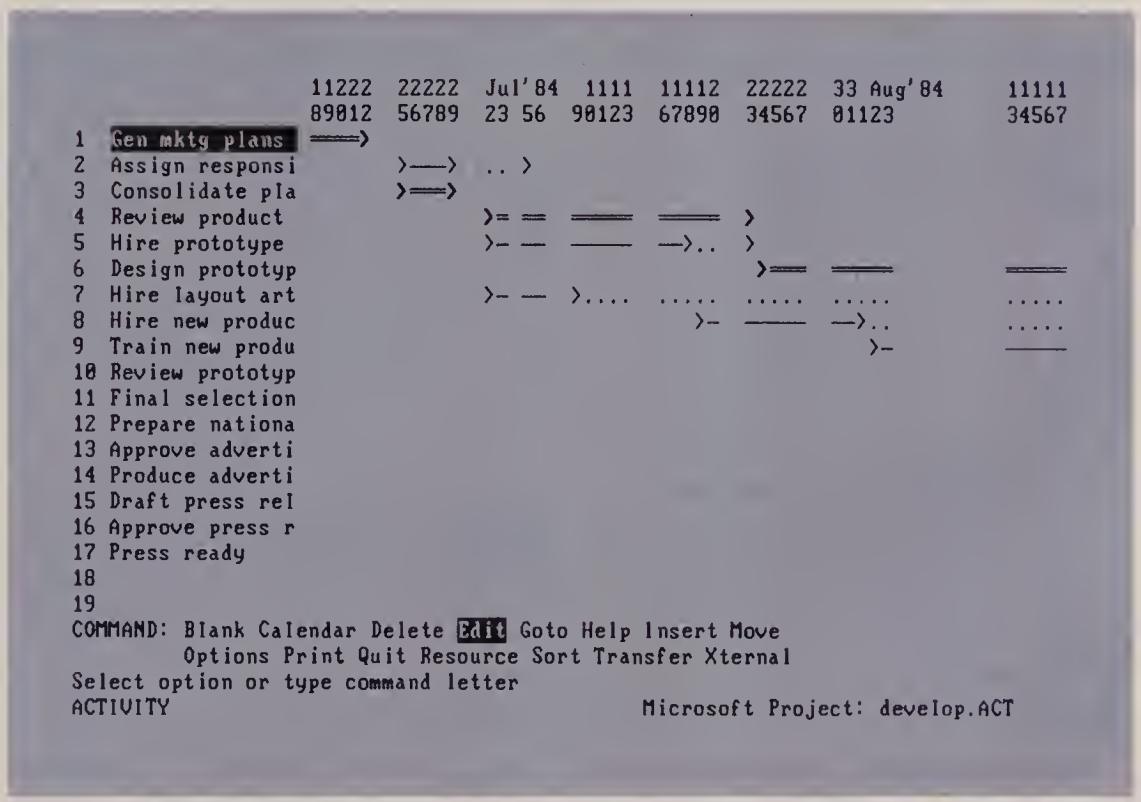


Figure 2: The Activity screen is divided into four areas: the time scale, activity list, project schedule, and command menu.

Activity Reports

Schedule report. Project's most useful report is presented in time-line format. If you use an IBM Graphics printer or an Epson MX or FX printer, the schedule is printed sideways in one continuous form, eliminating manual cutting and pasting of pages. The printed schedule includes the full 30-character activity descriptions at both ends.

Detail report. This report summarizes the information associated with one or more project activities. Included are early and late start and finish dates, predecessors and successors, and resources and costs assigned to the activity.

Table report. This report provides a single listing of all project activities, each activity's duration, early and late start and finish dates, and slack time available. It also states whether or not the activity is critical (see Figure 4).

Resource Reports

Resource Cost report. The Resource Cost report is a summary of project resources similar to the Resource screen shown in Figure 3. It includes resource capacities per day, cost per day, and projected resource use and total cost for the rest of the project. You can use this report to plan a new project or to forecast demands for the remainder of a project in progress.

Resource Histograms report. This resource profile shows how a particular resource is used. It reflects the level of activity required over the course of the project and helps you use resources effectively.

Resource Detail report. This report itemizes the activities to which a particular resource is committed. It contains the amount of time the resource is committed to each activity and shows each activity's duration, early and late start and finish dates, and slack time available. The report can be given to a team member as a detailed listing of his or her responsibilities. Such a feature can be useful and is not included in many other project management packages.

Resource	Capacity	Unit Cost	Per	Days to Complete	Cost to Complete
1 Forecaster	No limit	1800.00	Month	35.0	2907.90
2 Production mngr	No limit	2550.00	Month	70.0	8239.06
3 Recruiter	No limit	2355.00	Month	32.0	3478.40
4 WP operator	No limit	55.00	Day	37.5	2062.50
5 WP equipment	No limit	26.00	Day	35.0	910.00
6 Production VP	No limit	3700.00	Month	22.0	3757.20
7 Prototype artst	No limit	235.00	Day	30.0	7050.00
8 Graphic artst	No limit	115.00	Day	65.0	7475.00
9 Production sup	No limit	2000.00	Month	20.0	1846.29
10 Marketing VP	No limit	3700.00	Month	20.0	3415.64
11 Ad writer	No limit	250.00	Day	40.0	10000.00
12 Marketing mngr	No limit	2750.00	Month	3.5	444.26
13 Ad mngr	No limit	2400.00	Month	2.5	276.94
14 Paste-up artst	No limit	75.00	Day	7.5	562.50
15 PR mngr	No limit	1900.00	Month	5.0	438.49

Cost to complete: 52864.18 Total cost of project: 52864.18

COMMAND: Activity Calendar Delete Edit Goto Help
Options Print Quit Transfer View
Select option or type command letter
RESOURCE Microsoft Project: develop.RES

Figure 3: The Resource screen summarizes resource use and costs. Resource descriptions are automatically copied from the Activity screen.

A Change in Plans

Once you've set up a project and printed a schedule and other reports, you might be tempted to relax. But remember an important law of project planning: Anything that can be changed will be changed until there's no time left to change anything. Fortunately, making adjustments with *Project* is easy, and projectwide recalculation is fast. You can continually adjust a project's schedule, calendar, or resources over its course to reflect decision changes, missed milestones, or disappearing resources. *Project*'s automatic recalculation gives you quick on-screen feedback regarding the impact of a change on activity and project completion dates, total project cost, and cost to completion.

One of *Project*'s best features is its View command. This function generates a bar chart that allows you to review the estimated use of project resources (see Figure 5). The display lists the activities to which a resource is allocated during any time period. View provides an excellent visual representation of resource use that makes short work of identifying overused and underused resources. Such a feature is rare among project-scheduling programs in *Project*'s price range. On the down side, *Project* is primarily a planning tool and provides few features that help you track progress and com-

Yo-Yo Project
Product Development
Table of Activities

Project: develop.ACT — Date: 05/04/1984

#	Activity	Duration (Days)	Early Late Start	Early Late Finish	Slack Avail	Critical
1	Gen mktg plans	15	06/04/1984 06/04/1984	06/22/1984 06/22/1984	0	*
2	Assign responsibilities	5	06/25/1984 06/28/1984	06/29/1984 07/05/1984	3	
3	Consolidate plans	5	06/25/1984 06/25/1984	06/29/1984 06/29/1984	0	*
4	Review product lines	15	07/02/1984 07/02/1984	07/23/1984 07/23/1984	0	*
5	Hire prototype artist	12	07/02/1984 07/06/1984	07/18/1984 07/23/1984	3	
6	Design prototypes	30	07/24/1984 07/24/1984	09/11/1984 09/11/1984	0	*
7	Hire layout artist	5	07/02/1984 10/10/1984	07/09/1984 10/16/1984	65	
8	Hire new production crew	10	07/19/1984 10/31/1984	08/01/1984 11/13/1984	68	
9	Train new production crew	20	08/02/1984 11/14/1984	09/06/1984 12/13/1984	68	
10	Review prototypes	5	09/12/1984 09/12/1984	09/18/1984 09/18/1984	0	*

Figure 4: The Table report summarizes information about all project activities. It shows duration, slack time, and early and late start and finish dates and also identifies critical activities.

pare planned to actual cost and schedules. For example, *Project* does not allow you to designate an activity as partially or fully completed, nor does it compare the projected versus the actual amount of a resource used.

When Your Tasks Are Many

You may need to work with a project of more than 128 activities, or you may want to establish interdependencies between the activities of two or more projects. *Project*'s Xternal Link function establishes a connection between two projects–the "current" project (the one with which you are currently working on screen) and an "external" project (one created previously and now stored on disk). When you link your current project with an external project, the external project is represented as a single activity in the current project. This is a useful way to summarize the status of several

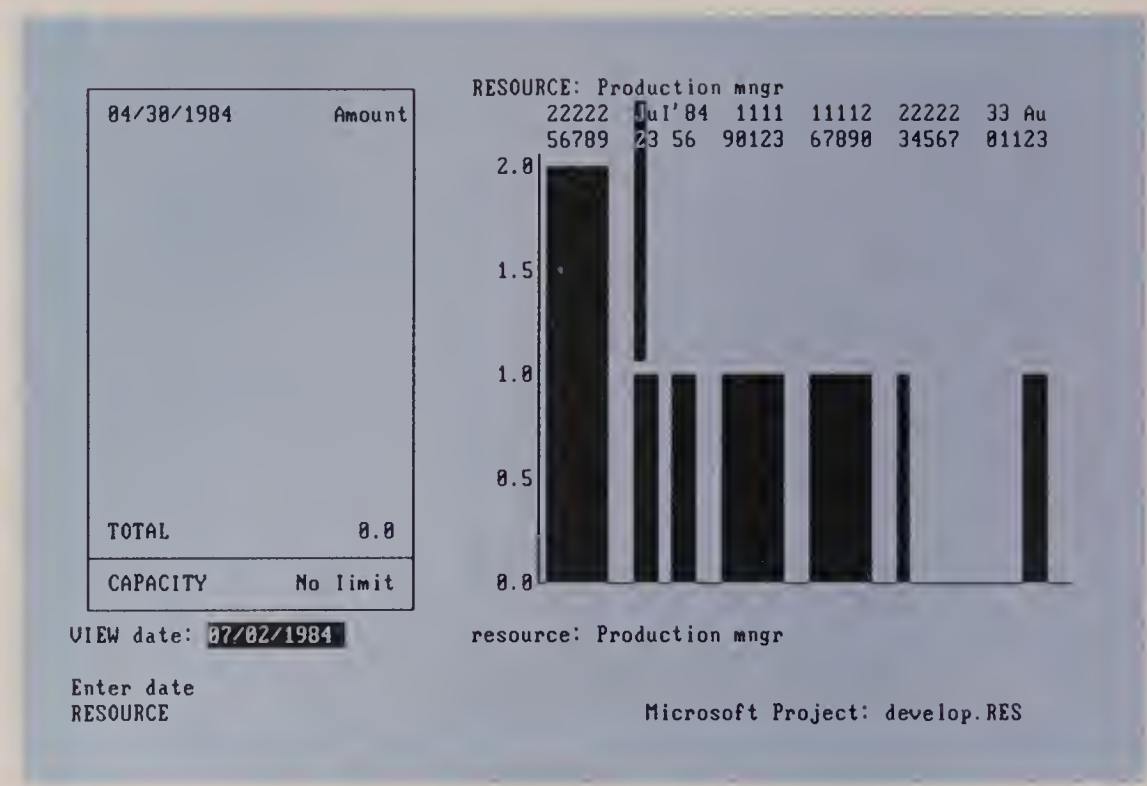


Figure 5: The View screen enables you to look at the pattern of use for a particular resource and see if resource capacity has been exceeded.

projects for senior management or to set up projects that encompass subordinate projects.

Unfortunately, an external project cannot include any predecessors from the current project. Thus, *Project* cannot adjust the external project's start date to accommodate the completion date of a predecessor activity in the current project. However, the linked external project (viewed as an activity) can be designated a predecessor to another activity in the current project.

Data to Go

Project data can be exported to other programs such as Microsoft's *Multiplan* and *Chart* packages. Two commands enable you to transfer cost and resource information into a SYLK (Symbolic Link) file that can be used with those two Microsoft programs. *Project* includes Microsoft's CONVERTD utility, which allows the program's data to be used with columnar and delimited ASCII text files, DIF (data interchange format) files, and SDF (symbolic data format) files. In such formats *Project* data can be transferred to programs such as *dBASE II* and *1-2-3*.

Documentation

Project's documentation comes in two forms: on-screen help and a printed manual. The manual is designed to quickly introduce the novice to the program and project management concepts. It is divided into three sections: a tutorial, a user guide, and two reference sections. The reference sections include instructions regarding installation and use of the Microsoft Mouse. A mouse can significantly reduce keystrokes and make the program easier to use.

Foiling Murphy's Law

Project is a strong entry in the realm of relatively low-priced project-planning software. Its command structure and editing capabilities make it easy to use. *Project* is apt to be valuable to planners of small projects who need well-organized activity and resource information plus quick feedback on the effects of actual and potential planning decisions. *Project*'s View function and Resource Detail Listing report set it apart from other packages in its class. Keep in mind that a program of this type requires that you accurately estimate the time required to complete each activity. Otherwise, what can go wrong will go wrong, and Murphy will have the last laugh.

Bill Dauphinais is a CPA and the partner in charge of management consulting services at the Sacramento, California, office of Price Waterhouse. Leonard Darnell is a CDP and a manager at the Los Angeles office of Price Waterhouse.

Microsoft Project
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004
206/828-8080
List-price: $250
Requirements: 128K, one disk drive (IBM Graphics, Epson MX, or Epson FX printer required for printing schedules in one continuous form)

Why people choose an IBM PC in the first place is why people want IBM service...in the first place.

After all, who knows your IBM Personal Computer better than we do?

That's why we offer an IBM maintenance agreement for every member of the Personal Computer family. It's just another example of blue chip service from IBM.

An IBM maintenance agreement for your PC components comes with the choice of service plan that's best for you—at the price that's best for you.

Many customers enjoy the convenience and low cost of our carry-in service. That's where we exchange a PC display, for example, at any of our Service/Exchange Centers.

And for those customers who prefer it, we offer IBM on-site service, where a service representative comes when you call.

No matter which you choose for your PC, an IBM maintenance agreement offers you fast, effective service.

Quality. Speed. Commitment. That's why an IBM maintenance agreement means blue chip service. To find out more about the specific service offerings available for your PC, call 1 800 IBM-2468, Ext. 553 and ask for PC Maintenance.

Blue chip service from IBM®

Circle 781 on reader service card

OfficeWriter: Simply Dedicated

OfficeWriter isn't just another Wang-alike. Faster and easier to use than most heavyweight word processing programs, OfficeWriter offers dedicated word processing in a sleek new form.

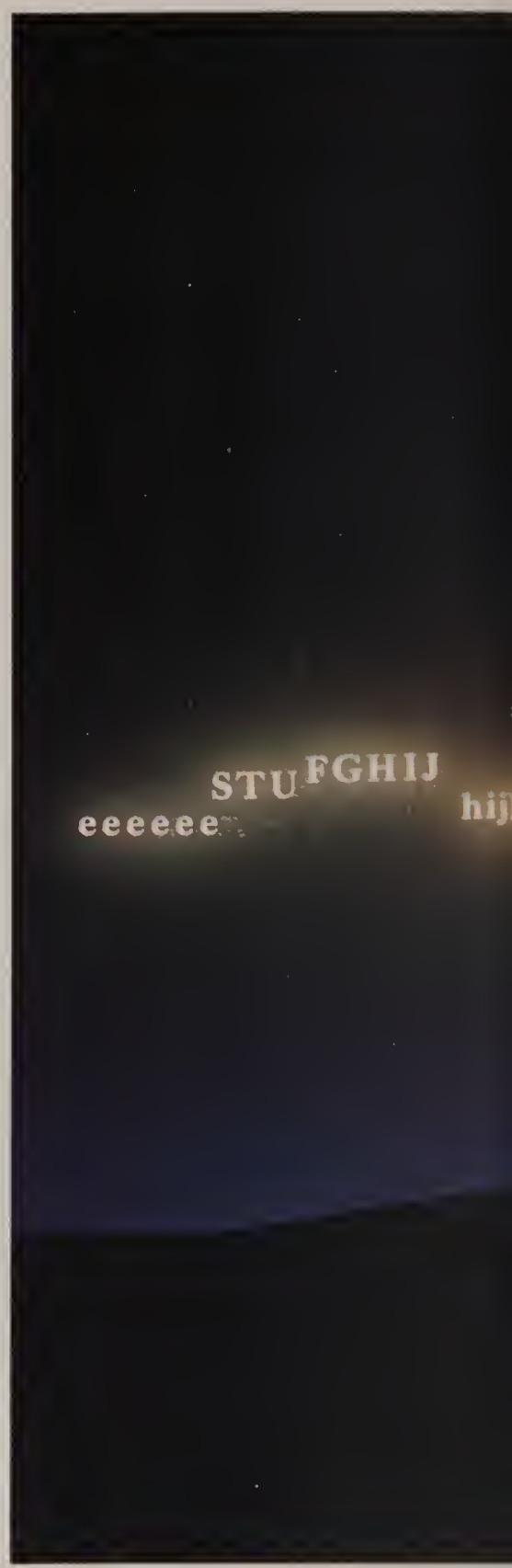
Rebecca Bridges

Every word processing package seems to have something wrong with it. *WordStar* is difficult to learn; *MultiMate* is slow; *pfs:write* lacks power; *Microsoft Word* has unintelligible documentation. Where is the perfect word processing program for the IBM PC? It doesn't exist, but one program comes close. Office Solutions' *OfficeWriter* is fast and easy to learn, and it contains almost all the features of a Wang dedicated word processor.

OfficeWriter offers advanced functions such as mail merge, multicolumn formats, boilerplate insertion, libraries, and a print spooler. For an extra $120, Office Solutions throws in an excellent spelling checker, *OfficeSpeller* (see the sidebar, "OfficeSpeller").

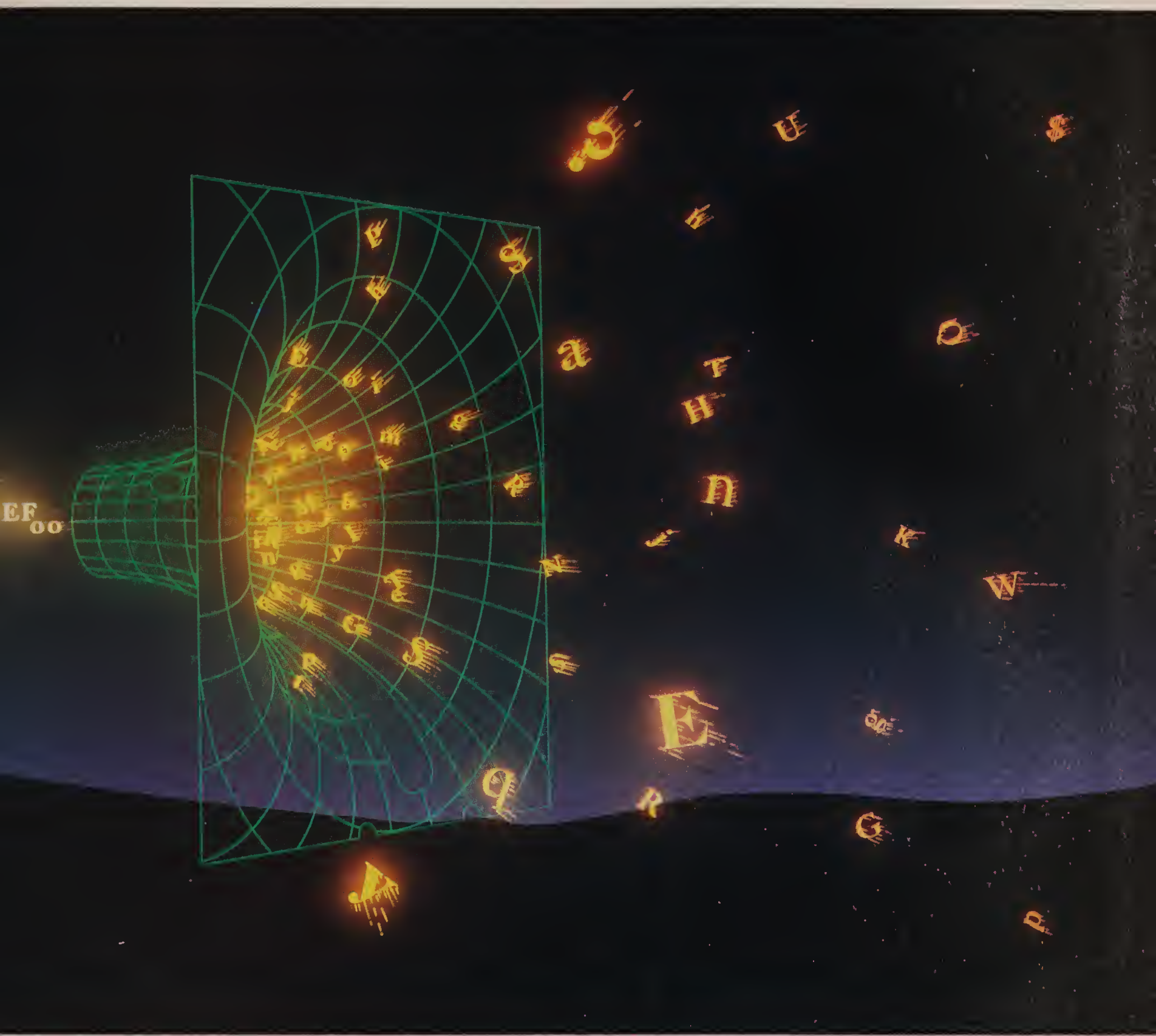
By assigning commands to the function keys, *OfficeWriter* gives the PC keyboard the feel of a dedicated word processor. You do not have to work your way through mazes of menus or memorize complicated control commands. Commands are logical and consistent. Despite a full list of features, *OfficeWriter* is remarkably speedy. The program executes most commands two to five times faster than *MultiMate* and one and a half times faster than *DisplayWrite 2* (see Figure 1).

The size of an *OfficeWriter* document is limited by the amount of internal memory (RAM) available. Table 1 indicates the maximum length of a document for various amounts of RAM. The percentage of memory used appears in the upper left corner of the screen at all times.



Getting Started

Installation involves no more than copying DOS onto the *OfficeWriter* program disk. Unfortunately, the disk is copy protected, and hard disk users must have the original program disk in the floppy drive when starting each session. You can acquire a free backup disk by sending in the



license registration form, which also entitles you to customer support and notification of updates. Updates are free for the first two months and $50 thereafter.

To get you started, the manufacturer includes an excellent on-screen tutorial on a separate disk. Unlike those tedious "press the space bar to continue" tutorials that control your every keystroke, this tutorial is an actual *OfficeWriter* file. It explains how to use the most common commands, with exercises and the necessary steps presented on the screen. The printed tutorial in the *OfficeWriter* manual explains more advanced functions.

The manual also contains a detailed table of contents, chapters explaining each option on the main menu, an alphabetized reference section, a list of error messages, a glossary, and an index. *OfficeWriter* does not play hide-and-seek with the program's constraints. Command limitations,

Three "Dedicated" Word Processors Square Off

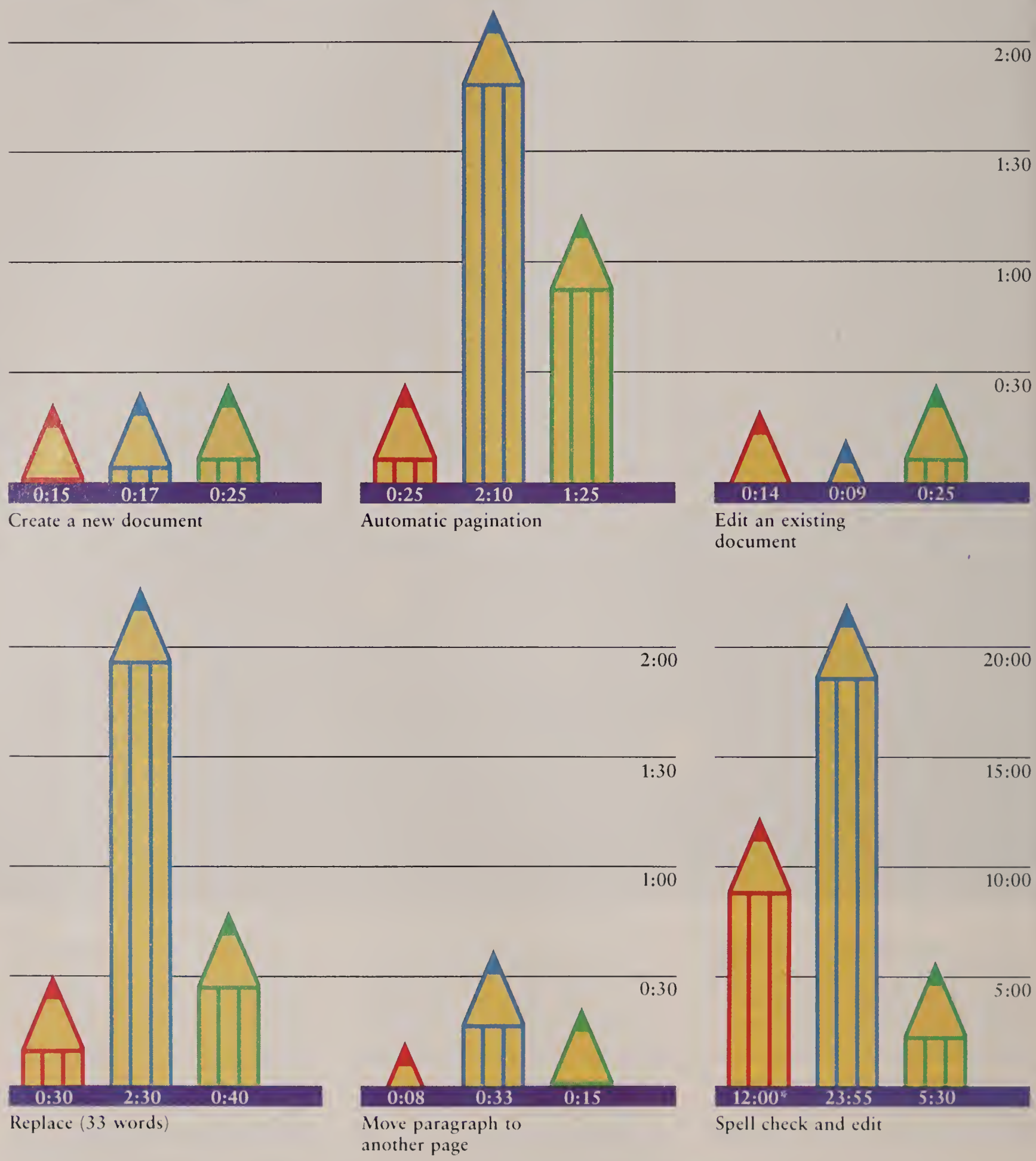


Figure 1: Execution speeds on six word processing tasks. Speeds are shown in minutes and seconds. All tests used a 13-page document on a floppy-based 512K RAM IBM PC.

OfficeWriter
MultiMate
DisplayWrite 2
* OfficeWriter with OfficeSpeller

such as maximum line length or maximum number of lines in a footer, are prominently displayed in the reference section.

Table 1: Maximum document size depends on system RAM.

	192K	256K	320K	640K
Number of characters	64,000	128,000	192,000	512,000
Number of pages	32	64	96	256

Go, Go, Go

To promote the feeling of dedicated command keys, Office Solutions includes a plastic template and stick-on labels for the keys. The <Alt> key functions are listed on a plastic ruler that fits on the keyboard ledge. When you're using the program, you can press the <Esc> key to bring up several help screens.

All commands involving more than one step are executed with the Go key (<GrayPlus>). For example, to search for a word in a document, press <F3>, enter the text you wish to search for, and then press <GrayPlus>. *OfficeWriter* uses the Go key between each step of a command or in executing a command. Any command can be aborted by pressing <F10>, the cancel key.

Screen highlighting is used consistently for marking specific areas of text. To delete, move, copy, underline, or boldface, you give the appropriate command and then use the cursor keys to shade the selected block of text on the screen.

Many cursor commands work logically with the <Alt> key. For example, when you hold down the <Alt> key and press the <Space> bar, the cursor jumps ahead a word at a time. Similar commands move the cursor by sentence, by paragraph, to the beginning and end of the line, and to the top and bottom of the page. Cursor movement is generally quick and responsive. Slight delays are noticeable in scrolling line by line, moving to the end of the screen or the page, and moving between pages in a long document. But all other commands execute immediately.

Like most word processing programs, *OfficeWriter* uses embedded format lines. You can insert format lines for different line lengths, line spacing, and margin settings throughout a document. If you change settings after text is entered, the text following the format line adjusts accordingly. When text is inserted or deleted, the paragraph automatically adjusts to the current format settings. You can globally change format lines throughout a document by pressing <Alt>-<F4>.

Instead of providing separate commands for deleting words, lines, or characters, *OfficeWriter* uses only the <Del> key combined with cursor highlighting. Although this makes the program easier to learn, the editing process is less efficient. Moreover, there is no destructive backspace, so deleting one character requires two keystrokes. However, *OfficeWriter* does provide an Undo Delete command to restore text you have just deleted.

OfficeWriter's default input mode is overtype, which is fine except that you can't change the default to insert. This inconvenience is common to most packages that imitate Wang. To insert text you press the <Ins> key, and all text below and to the right of the cursor disappears to make room for the new text. You must press <GrayPlus> to leave the insert mode.

Sensitive Searching

Just about every word processor offers search and replace, but *OfficeWriter* is one of the few that makes case-sensitive searches. For example, if you want to replace the word *file* with *document*, *OfficeWriter* will replace *File* with *Document*, *FILE* with *DOCUMENT*, and *file* with *document*. However, there is no option to search backward through a file or to search for whole words only.

OfficeWriter has four options for saving a document: save and print, save and exit, save and return to document, and cancel—do not save. Oddly, the save and cancel commands are on the same function key, inviting catastrophe. Occasionally, I found myself pressing <Shift>-<F10> (do not save) instead of <Alt>-<F10> when I wanted to save and return to the document. Fortunately my ten-

page document and I were saved by a confirmation message.

One important feature that *OfficeWriter* lacks is the ability to display a directory when it asks you for the name of a document to edit or print. Who can always remember the exact name of a document? However, there is an indirect way around this problem. The Manage Documents option on the main menu displays the names of all *OfficeWriter* documents. If you highlight the name of the document you wish to work with and then return to the main menu, this name will automatically be entered when you select the Edit or Print option.

OfficeWriter excels in column manipulation features. The multiple column format allows you to print several columns of text side by side. Initially each column is typed on a separate page; then before printing you indicate how many columns you want and where each should print. This feature is useful for newsletters, lists, and other documents in which you may want to edit one column without distorting another.

Columns of numbers or text can be manipulated with the Column Copy, Column Move, and Column Delete commands. Decimal tabs are available to align columns of numbers, but *OfficeWriter* lacks a math function to add the columns.

One nice extra is a date function. Wherever you type **&date** in a document, the current date will be substituted when the document is printed.

Pagination and Printing

Because *OfficeWriter* is a page-oriented word processor, you cannot simultaneously see the end of one page and the beginning of the next on the screen. If you prefer, you can type the document without page breaks, keeping it on one long page (up to 64K). Before printing, however, you should run the pagination option, which automatically breaks the document into pages. For more control over page endings, you can enter page breaks manually. Up to three lines of text can be placed at the top and bottom of each printed page as a header and footer. *OfficeWriter* does not currently provide a footnoting feature.

Because OfficeWriter *is a page-oriented word processor, you cannot simultaneously see the end of one page and the beginning of the next.*

With a few exceptions, *OfficeWriter* is a "what you see is what you get" word processor. Paragraphs, page breaks, underlining, and boldface are displayed on screen as they will appear when printed. If you have a color graphics monitor, underlining appears in inverse video or can be displayed in a different color. Certain features, such as compressed and double-width print, right justification, and line spacing, do not take effect until the document is printed. You can program special printer codes to take advantage of additional enhancements your printer may have, such as italics, enhanced print, or elite type.

Installing your printer could not be easier. The first time you enter the print option, you press <F1> to select a printer from a list of 32.

Earlier versions of *OfficeWriter* lacked a feature mandatory for any busy office: a print spooler. A spooler allows you to work on other word processing tasks, such as editing, while a document is printing. The newest *OfficeWriter*, version 3.0, corrects this omission. In addition, you can now queue up to ten documents to print and assign a priority for each.

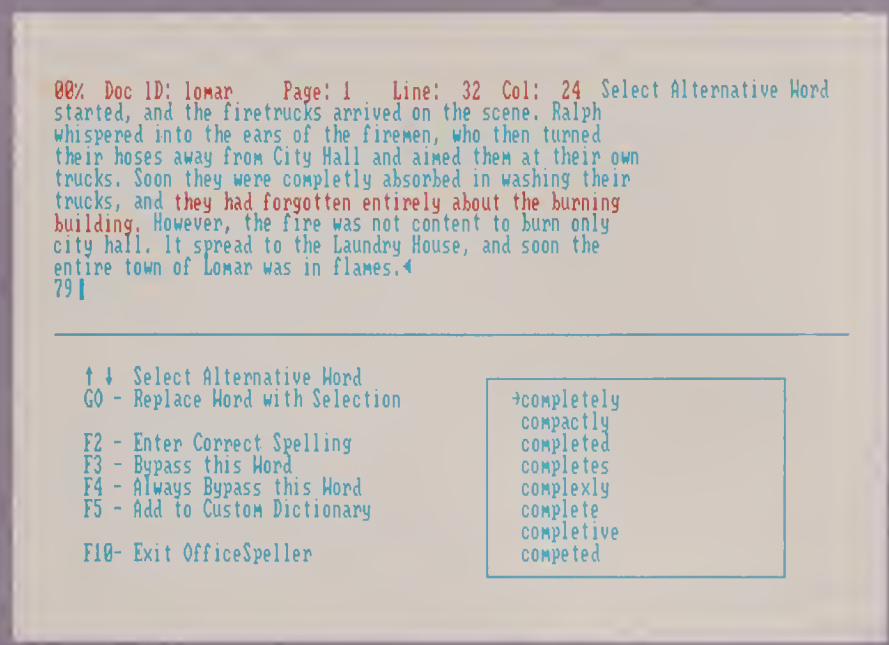
Moving Text

One of *OfficeWriter*'s most powerful capabilities is manipulation of text between documents. You can copy text into a new or existing document using the SuperCopy command, or you can move text from one document to another with SuperMove. These functions allow you to build documents easily from boilerplate text. You can insert stock phrases or paragraphs into a document by pressing <Alt>-<F1>.

OfficeSpeller

The more expensive version of *OfficeWriter* comes with *OfficeSpeller*, a spelling checker containing an 80,000-word dictionary. To invoke *OfficeSpeller*, press <Alt>-? while you are editing a document. On a floppy-based system you are instructed to insert the dictionary disk. You are then given a choice of checking either a word or the entire document. If you specify 'Spell Check a Word', *OfficeSpeller* checks only the word the cursor was resting on when you invoked the command. This feature is helpful if you don't have a dictionary at hand.

If you want to check the entire document, specify 'Spell Check a Document'. When the program finds a misspelled word, it gives you five choices. You can enter the correct spelling, request *OfficeSpeller* to display a list of alternatives (see Screen A), bypass the word once, bypass all occurrences of the word, or add it to a Custom Dictionary.



Screen A: Office Speller combines an 80,000-word dictionary with a spelling checker that suggests alternative spellings.

OfficeSpeller also "remembers" words encountered earlier in a document. If a word is consistently misspelled throughout a document, the program will automatically correct later occurrences of the word once you indicate the correct spelling.

The problem with spelling checkers is that they are slow. Fortunately, *OfficeSpeller* is faster than most. It takes about 10 minutes to check and correct a ten-page document. Some spelling checkers take that much time simply to check the document and report the misspelling.

Our toll-free

SOFTWARE

Aptec *(for color Prism Printers)*
Rainbow Writer Color Text Formatter $119.
Rainbow Writer Screen Grabber ..... 69.
Ashton-Tate
dBase II ..... call
dBase III ..... call
Framework ..... call
Friday! ..... 169.
Best Programs
Personal Finance Programs ..... 65.
PC/Professional Finance Program II .. 149.
PC/Fixed Asset System *(version 3.0)* .. 329.
PC/Tax Cut ..... 129.
Personnel (Level 1) ..... 279.
Personnel (Level 2) ..... 419.
Personnel (Level 3) ..... 559.
Bible Research
THE WORD *(KJV Bible - on disk)* ..... 145.
Borland International
Sidekick ..... 30.
Sidekick (non-protected) ..... 49.
Turbo Pascal ..... 30.
Turbo 8087 ..... 59.
Turbo Toolbox ..... 30.
Turbo Tutor ..... 19.
Broderbund
Bank Street Writer ..... 49.
Bruce & James
WordVision ..... 39.
Continental
Home Accountant Plus ..... 89.
The Tax Advantage ..... 39.
Financier
Financier II ..... 109.
FriendlySoft
FriendlyWriter *(with FriendlySpeller)* .... 55.
Funk Software
Sideways ..... 39.
Harvard Software
Harvard Project Manager ..... 209.
Harvard Total Project Manager ..... 279.
Hayes
Smartcom II ..... 89.
Lifetree
Volkswriter Deluxe *(with TextMerge)* ... 159.
Volkswriter Scientific ..... 289.
Living Videotext
ThinkTank ..... 109.
Lotus Development
1-2-3 *(version 1a)* ..... call
Symphony ..... call
Micro Education (MECA)
Managing Your Money ..... 99.
Running Program (Jim Fixx) ..... 49.
Micropro
WordStar ..... 179.
WordStar 2000 *(hard disk recommended)* ..... 259.

PC Connection Software Special

What! No software special???

Now don't jump to any hasty conclusions. We know that you're used to finding a low-priced software package in this space every month. Well, now you can get used to finding a whole page of specials. Where are they? Just flip the page.

There you'll find not one, but three software specials — on Infoscope, Microsoft Word, and ATI Training Programs. Along with not three but five hardware specials.

WordStar 2000 Plus *(hard disk recommended)* ..... $299.
Microrim
R:base 4000 ..... 259.
Extended Report Writer ..... 85.
Clout II ..... 135.
Microsoft
Multiplan *(version 1.2)* ..... 125.
Microsoft Spell ..... 35.
Microsoft Word *(version 2.0)* ... see special
Microsoft Mouse with software ..... 135.
Microsoft Serial Mouse with software .. 135.
Microsoft Project ..... 155.
Microsoft Chart ..... 155.
Microstuf
Crosstalk XVI ..... 99.
Infoscope ..... see special
Transporter *(includes Crosstalk)* ..... 169.
MultiMate International
MultiMate *(version 3.3)* ..... 259.
PCsoftware
PCcrayon II ..... 39.
Executive Picture Show ..... 139.
CREATABASE ..... 47.
Peter Norton
Norton Utilities *(version 3.0)* ..... 59.
Rosesoft
Prokey 3.0 ..... 89.
Satellite Software
WordPerfect *(version 4.0)* ..... 249.
Software Arts
TK!Solver ..... 249.
Software Publishing
PFS:Access *(new version)* ..... 84.
PFS:File ..... 84.
PFS:Graph ..... 84.
PFS:Plan ..... 84.
PFS:Proof ..... 59.
PFS:Report ..... $77.
PFS:Write ..... 84.
Sorcim
Supercalc 3 ..... 199.
Virtual Combinatics
Micro Cookbook ..... 29.
Warner Software
The Desk Organizer ..... 139.

TRAINING

ATI - *See Special*
SKILL BUILDER PROGRAMS
Intro and How To Use:

Word Processing	MS-DOS (2.0)
Business Software	PC-DOS (2.1)
Data Bases	Home Accou 'ant
Basic	VW Deluxe
IBM-PC	TK!Solver

Compaq ..... *each* 32.
TRAINING POWER PROGRAMS
How to Use:

dBase II	dBase III	Lotus 1-2-3
MS Word	Easywriter II	Multimate
Multiplan	Supercalc 3	Framework
Symphony	Wordstar	

..... *each* 49.
Comprehensive Software
Intro to Personal Computing ..... 39.
Intro to Databases ..... 39.
Intro to Communications ..... 39.
Intro to the Operating System (PC Tutor) 39.
Individual Software
The Instructor ..... 35.
Professor DOS ..... 47.
Tutorial Set *(both items above)* ..... 75.
Professor Pixel ..... 47.
Typing Instructor ..... 39.
Scarborough Systems
Master Type ..... 35.

EDUCATIONAL

Digital Research
Diagnostic Test (PSAT) ..... 14.
OwlCat SAT *(15 hour)* ..... 63.
OwlCat SAT *(60 hour)* ..... 169.
FriendlySoft
FriendlyWare/PC Introductory Set ..... 35.
Spinnaker
Educational Games for Young Computer Users. *(All require graphics board)*
Delta Drawing *(ages 4 to adult)* ..... 34.
Snooper Troops I *(ages 10 to adult)* ... 30.
Snooper Troops II *(ages 10 to adult)* ... 30.
Most Amazing Thing *(ages 10 & up)* ... 27.

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS
©COPYRIGHT MICRO CONNECTION, INC. 1985. ALL ITEMS SUBJECT TO AVAILABILITY PRICES SUBJECT TO CHANGE WITHOUT NOTICE. IBM IS A REGISTERED TRADEMARK OF IBM CORP
MICRO CONNECTION IS A TRADEMARK OF MICRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK OF MICRO CONNECTION, INC., MARLOW, NH

PC CONNECTION®

Circle 136 on reader service card

PC Pacifier.

Things that go crash in the night.
Losing sleep over some PC problem? Do what our cool, calm, collected, and very furry friend is doing. Place an absolutely toll-free call to PC Connection in the sleepy little village of Marlow, NH (pop. 546). Because we're the largest direct merchant of PC products in the world. And when one of our customers has a question about one of our products, we find the answer.

So when there's something strange, when there's something weird, who you gonna call? Call us. Months before you're ready to buy, or years later. *Because our toll-free number isn't just for orders, it's for support.*

Farewell to alarms.
You'll sleep better knowing that our phone consultants can bring order to the chaos of manufacturer's installation instructions, or odd configurations. They can also help you select the best software for your applications, and let you know if there's an update coming soon.

We have technical wizards on staff whose entire job is to answer complex questions in simple English sentences. They've been using PC's, XT's, and AT's for so long, with so many different add-ons and programs, that they can resolve just about any glitch, gloom, or glaring error you encounter.

Sleep on it.
Kids have it easy. When they wake up screaming in the middle of the night, they just turn to a teddy bear for reassurance. But where can the PC insomniac turn? To his or her PC Connection pillow case, featuring our supremely reassuring mascot. They're free to anyone who places a $500 order between now and June 30.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and at 5:00 on Saturday.

The PC Connection pillow case. Limit one set per customer. Take two and call us first thing in the morning. Offer not available to commercial accounts.

For the IBM-PC (XT & AT) exclusively.

PC CONNECTION®

number is for sal

Presid t's Choice *(ages 13 to adult)* $27.
Face M ker *(ages 3 to 8)* ..... 23.
Kids o Keys *(ages 3 to 9)* ..... 23.
Story M chine *(ages 5 to 9)* ..... 23.
Fractio Fever *(ages 7 to adult)* ..... 23.
Kinder Comp *(ages 3 to 8)* ..... 20.
Rhyme and Riddles *(ages 5 to 9)* ..... 20.
Hey D dle Diddle *(ages 3 to 10)* ..... 20.
Alphai t Zoo *(ages 3 to 8)* ..... 20.
Stone *equires graphics board)*
My Le rs,Numbers,Words *(ages 1 to 5)* 29.
Kids S ff *(ages 3 to 8)* ..... 29.
Across e U.S.A. *(ages 5 and up)* .... 22.

GAMES

Blue C ip
Million e ..... 39.
Tycoo ..... 39.
Baron ..... 39.
Brode und
Lode r nner ..... 25.
Frienc /Soft
Friend Ware/PC Arcade ..... 35.
Hayde Software
Sargon ill ..... 35.
Infoco *Difficulty levels shown in italics*
Seasta er *(junior)* ..... 25.
Encha er *(standard)* ..... 25.
the Wi ess *(standard)* ..... 25.
Planet l *(standard)* ..... 25.
Cutthro t *(standard)* ..... 25.
Hitchh er's Guide *(standard)* ..... 25.
Zork I tandard) ..... 25.
Zork II dvanced) ..... 29.
Zork III advanced) ..... 29.
Infidel dvanced) ..... 29.
Sorcer (advanced) ..... 29.
Suspec (advanced) ..... 29.
Deadli (expert) ..... 33.
Starcro s (expert) ..... 33.
Suspe ed (expert) ..... 33.
Invisic es (hint booklets) are available for mo Infocom games. Specify game 7.
Micros it
Flight S mulator ..... 35.
Origin Systems
Ultima ..... 39.
Orion
J-Bird ou'll never sleep) ..... 29.
PC-Ma ..... 25.
PCSoft ware
Armch r Quarterback ..... 27.
Chess 2001 ..... 27.
Champ onship Blackjack ..... 23.
Profes ional Software
Trivia Fever ..... 23.
Sir-Tech
Wizard y ..... 42.
Spectrum Holobyte
GATO ..... 27.
Sublogic
Night Mission Pinball ..... 29.

PC Connection Hardware Special

What! No hardware specials either???

C'mon. PC Connection giveth, but we never taketh away. We now have a whole page of specials. Where are they? Just flip the page.

There you'll find five hardware specials — new low prices on disks, mice, cables, modems, and chips. So be sure to check out our new specials page, featuring our omnipresent mascot in a positively divine pose.

OUR POLICY

- We accept VISA and MASTERCARD.
- No surcharge added for charge cards.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All shipments insured; no additional charge.
- Allow 1 week for personal and company checks to clear.
- COD max. $1000. Cash or certified check.
- 120 day guarantee on all products.*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

SHIPPING

Continental US: For monitors, printers, and drives, add 2% to all orders. For all other items, add $2 per order for UPS surface, $3 per order for UPS 2nd-Day-Air. We particularly recommend 2nd-Day-Air if you live west of the Mississippi or south of Virginia. In most cases it will only cost $1 more and will save you up to four days on delivery time. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add $3 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information.

1-800/243-8088

PC Connection 390W
6 Mill St., Marlow, NH 03456
603/446-3383

HARDWARE

AST Research ***(For IBM-PC or XT)***
All AST Boards come with SuperDrive, SuperSpool, and one year warranty.
SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports *(game port optional)* ..... $249.
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port *(parallel, game, or second serial port optional)* ..... 249.
MegaPak 128k *(not upgradeable)* .... 209.
MegaPak 256k ..... 339.
I/O Plus II with clock calendar and serial port *(parallel, game, or second serial port optional)* ..... 129.
Parallel, Game, or second Serial Port *for any AST board (specify board)* ..... 35.
Connectall *connector bracket (PC only)* 19.
AST-5251 ..... 529.
AST-3780 ..... 589.
Amdek
Video 300G monitor *(green)* ..... 139.
Video 300A monitor *(amber)* ..... 149.
Video 310A monitor *(amber)* ..... 179.
Compucable - *See Special*
Plastic Keyboard & Drive Cover Set.... 17.
IBM Mono Screen Enhancement..... 17.
Printer to IBM Cable *(specify printer)*... 27.
Smartmodem to IBM Cable ..... 25.
Cuesta Systems
Datasaver *(200w power back up)*... call
Curtis
STANDS
PC Pedestal *(for IBM Mono or Color)*... 37.
PGS or Quadchrome Adapter for above 9.
Low Profile Tilt and Swivel Pedestal ... 37.
AD-2 Adapter for Portables ..... 15.
System Stand ..... 19.
CABLES
Extension Cables for IBM Mono Display 35
Keyboard Extension Cable *(3 to 9 feet)* 27.
AC Plug Adapter *(any monitor to your PC)* 8.
SURGE SUPPRESSORS
All surge suppressors have an on/off switch.
Diamond *(6 outlets)* ..... 33.
Emerald *(6 outlets; 6 ft cord)* 43
Sapphire *(3 outlets; EMI/RFI filter)*... 53.
Ruby *(6 outlets; EMI/RFI filter; 6 ft cord)* 63.
Epson
All Epson printers have built in graphics capability. In addition, the "Plus" printers can print in near letter quality (NLQ) with the addition of the NLQ parallel or serial option.
RX-100 ..... call
FX-80 Plus ..... call
FX-100 Plus ..... call
JX-80 ..... call
LQ-1500 *(letter quality dot matrix)* call
Printer to IBM Cable (specify printer) 27
FTG Data
Light Pen (Push Tip) 195
Demo Disk Set for Light Pen 39

For the IBM-PC *Exclusively.*

PC CONNECTION®

es and support.

Hayes - *See Special*
Smartmodem 300 $199
Smartmodem 1200 429
Smartmodem 1200B *(w/Smartcom II)* 369.
Smartmodem 2400 call
Smartcom II 89.
Compucable's
Smartmodem-to-IBM Cable 25.

Hercules Computer
Hercules Graphics Card *(parallel port)* 309.
Hercules Color Card *(parallel port)* 169.
Graph-X Software 42.

IOMEGA
Bernoulli Box 20 Meg 2595.
10 Meg cartridge 48.

key tronic
Deluxe keyboard (KB 5151) 169.

Koala
Koala Touch Tablet *with software (connects to game port)* 89.
Speed Key System 115.

Kraft
Joystick 35.

Maynard Electronics
Floppy Drive Controller 119.
Internal Hard Disk (10 Meg) with WS-1 Controller 859.
Internal Hard Disk (10 Meg) with WS-2 Controller 1049.

Mouse Systems
PC Mouse (w/software, pad, & PC Paint) 139.
PC Paint (software) 69.

NEC
Pinwriter P2-3 *(IBM, 80 column)* 679.
Pinwriter P3-3 *(IBM, 132 column)* 897.
Spinwriter 2050 *(3550's little brother)* 699
Spinwriter 3550 *(IBM-PC compatible)* 1369.
Spinwriter 8550 *(IBM-PC compatible)* 1789.

Orchid Technologies
All Orchid Boards come with PCnet Drive (Ram disk), PCnet spool (print spooling), disk caching & partitioning.
Blossom 64k upgradeable to 384k, with clock calendar, serial and parallel ports 229.
PCnet Daughter Board (piggybacks to Blossom) with version 3.0 networking software call
PCnet Blossom 64k Blossom Board with the Daughter Board installed call
PC Turbo 128k call

Paradise Systems
Modular Graphics Card 275.
Multidisplay Card 289.

Princeton Graphics
HX-12 RGB monitor *(690 x 240)* call
MAX-12 Amber monochrome monitor call

Quadram
Expanded Quadboard 64k expandable to 384k, with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software 249.
Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) *upgradeable to 512k* 169
Quadcolor I $197.
Quadlink 369
Quadchrome RGB Monitor 469
Quadchrome II 469.

SMA (Systems Management)
PC-Documate Keyboard Templates *available for:*

DOS/Basic 1.1	Supercalc 3
DOS/Basic 2.0-2.1	Wordstar
Lotus 1-2-3	Turbo Pascal
Symphony	WordPerfect
Multiplan (IBM)	dBase II
Multiplan (Microsoft)	dBase III
Peachtext 5000	Framework
Easywriter II	Multimate

Volkswriter Deluxe ..... *each* 12.

WICO
Joystick 35.

DRIVES

All drives are completely pre-tested and are supplied with a printout of the test results. Comes with complete step by step installation instructions. Drives are 320k/360k.

Tandon
TM 100-2 (5¼") *full-height drive (DS,DD)* 109.

TEAC
FD-55B (5¼") *half-height drive (DS,DD)* 119.
Free 'y' cable & bracket with each pair.

MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board ..... see special
64k Memory Upgrade Set for any memory board *specify make of board* ... see special
Install memory upgrades & run diagnostics *at time of board purchase only* ..... $10.

DISKS

Fuji
Disks for IBM-AT (96 TPI) *Box of 10* 39.

MAXELL
Disks for IBM-AT (96 TPI) *Box of 10* 49.

Verbatim - *See Special*
For a limited time - 2 free disks in every box of 10
Datalife Disks SS/DD *Box of 10* 21.
Datalife Disks DS/DD *Box of 10* 29.
Disk Drive Analyzer 19.
Flip Sort *(holds 75 disks)* 19.

INFORMATION SERVICES

Compuserve
Compuserve Information Service *(includes subscription, manual, 5 hours of connect time, monthly publications)* 25.

Source Telecomputing
The Source *(subscription & manual)* 39.

Last Chance!

Financierjr. still only $19!

Forget what everyone else has told you — the first thing you have to do when you get your new IBM-PCjr out of the box is figure out how you're going to pay for it. That's why JR CONNECTION, is giving you one last chance to buy Financierjr. for the super low price of $19. This complete home financing package will show you in black and white, green or amber, what is going on in your checkbook, credit card statements, and in that secret safe behind the third panel to the left of the fireplace.

If you have an IBM-PCjr, talk to our junior specialists at JR CONNECTION. 1-800/IBM-jrPC or 603/446-7761. They can help you with all your junior add-on and software needs.

(Please note: if you need products for the PC, XT, or AT you must call PC CONNECTION.)

1-800/IBM-jr PC

PC CONNECTION®

Circle 136 on reader service card

OfficeWriter's library option is a file organization tool not found in many word processing packages. Similar in function to DOS subdirectories, the library option enables you to group related documents together. You may choose to group documents by subject, author name, or whatever system works best for you. This organizational tool is especially helpful if your documents are stored on a hard disk.

OfficeWriter's merge function allows you to produce form letters, envelopes, and mailing labels. Document Merge offers several data base functions rarely found in word processing packages. Before printing you can specify a range of records to print and enter selection criteria. Up to nine conditions can be entered using logical operators such as equal to, greater than, and less than. This feature is handy if you need to reprint only a few of the form letters.

Setting up the secondary merge document (the name and address file) is needlessly complex. Special merge codes must surround each piece of data. If you forget the codes, the document will not print correctly.

OfficeWriter's conversion utilities enable you to import mailing lists for use as secondary merge documents. If you have a mailing list or a data base program that can create ASCII files, you can import the file into *OfficeWriter* and convert it to a secondary document.

Since *OfficeWriter* stores its documents in a special format, you must use the conversion utilities if you want to work on an *OfficeWriter* document with another program. Likewise, to edit an ASCII file in *OfficeWriter,* you must first convert it to an *OfficeWriter* document. The conversion utilities are accessed from the main menu but are contained on a separate disk.

An optional conversion utility called *OfficeLink* converts Wang Personal Computer documents to *OfficeWriter* documents and vice versa. Since Wang PC disks can be read by the IBM PC, the conversion is accomplished using software only; no hardware is needed. However, to transfer documents from other Wang word processing systems, such as the OIS or VS systems, you will need to purchase *OfficeCom*. The *OfficeCom* package includes communications software, a circuit board, and cables, enabling you to transfer documents either directly by cable or by modem.

Approaching Perfection

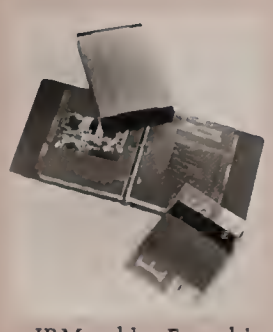
Office Solutions has done a fine job of integrating power and ease of use into a product that is appropriate for a full range of office needs. After working with *OfficeWriter* extensively for two months, I found no bugs. Its simplicity, logical command structure, and speed of execution set *OfficeWriter* apart from other packages that emulate dedicated word processors.

Several new features, including footnoting, four-function math capabilities, and auto-hyphenation, are scheduled to appear in future releases of the program. My wish list also includes a directory that is displayed automatically when you select the edit or print options, single-keystroke commands for inserting or deleting one character, and an easier way to set up merge documents. Were Office Solutions to add those features, *OfficeWriter* would come close to perfection.

Rebecca Bridges specializes in microcomputer training and development. Her firm, Systems Consulting, is located in Palo Alto, California.

OfficeWriter
Office Solutions, Inc.
5708 Odana Rd.
Madison, WI 53719
800/228-0747, 608/274-5047
List price: $325, with OfficeSpeller $445
Requirements: 192K, two disk drives

Hayes Telecommunications Package for under $500!



If you're not taking advantage of the vast resources of information services, this is a great time to get started. Package includes Hayes 1200 baud external modem, Smartcom 2.1 software, and a modem-to-IBM cable. Everthing you need to tie into services such as The Source and Compuserve. From Hayes, the industry leader.

$499 Hayes Package (PC, XT, & AT); modem, software, cable.

Don't leave ROM without it.

ATI is a leading manufacturer of microcomputer training programs. This month we're offering their "Survival Kit" – everything the beginning business user needs to know to get started – at significant savings. The kit includes 3 packages: *Intro to the PC, Intro to PC-DOS,* and *Intro to Business Software.* Sit your new users down with these programs, and save hours of personal instruction time.

$79 ATI Survival Kit (all 3 programs) (PC, XT, & AT).

Write softly and carry a big spelling checker.

We've got the brand new version of *Microsoft Word* (2.0) that includes a spelling checker and tutorial. This is the popular window-based word processor that you can use with or without the Microsoft Mouse. And it comes with a 100% money-back guarantee.

$235 Microsoft Word (version 2.0).

64k Memory Upgrades reduced 50%!

We've always been able to offer great prices on memory upgrades. Well, thanks to the legendary (and true) power of volume buying, we can now send you a 9 chip 64k upgrade set for approximately the price of a tank of gas – and, hey, which takes you further? Each upgrade comes with a full set of installation instructions, including proper switch settings. And, if you're buying extra memory at the same time you're buying an add-on board, we'll install and test it for $10 per board.

$19 Set of memory upgrades (PC & XT). $17 for orders of 10 sets or more.

Scope it out with Infoscope.

Infoscope is a powerful data manipulation program which deserves a serious look. This window-based software lets you key in on the information you want simply and very quickly. Create your own style of files, and even your own command vocabulary. Fast, easy-to-use, and very well-rated.

$129 Infoscope (PC, XT, & AT).

Free cord on bleu!

Sorry. That one's a little obscure. But the deal isn't. *Everyone who buys a parallel printer from us this month will receive Compucable's Printer to IBM Cable at no charge.* Why, you'll save enough for a steak dinner!

FREE Compucable's 6 ft. Printer to IBM Cable FREE with a parallel printer.

Discapades! 2 free with 10; 20,000 free with 100,000!

Well, we're exaggerating. We actually don't have 100,000 boxes of disks in stock. But while our ample supplies last, you can combine *our* super special price on Verbatim disks with *their* 12 for the price of 10 deal.

$25 Box of 12 DS/DD Verbatim Disks.

Here he comes to save the day.

A mighty mouse is on the way. The VisiMouse, manufactured by Mouse Systems for VisiCorp. This 2-button optical mouse connects to your serial port and does everything Mouse System's 3-button mouse does (with 33.3% fewer moving parts). The version 3.00V software lets you design pop-up windows for your favorite software. (An upgrade, featuring minor changes, is available for $22 from Mouse Systems.) Our package also includes the current version of PC Paint (normally $69 alone).

$89 VisiMouse (PC, XT, & AT).

390W

6 MILL STREET, MARLOW, NH 03456 800/243-8088 or 603/446-3383

PC CONNECTION®

©Copyright 1985 Micro Connection, Inc.

Speaking in Codes

Your code name: Spake Zarathustra. Your mission: to protect sensitive electronic communications. You have only 5 minutes and a limited amount of RAM. What are your alternatives? Two of them are DataSafe and Crypt Master.

Judy Getts

It's an art older than Tutankhamen, but its renaissance began with the first computer. It's called cryptography, the science of disguising messages with secret code. The ancient Persians simply substituted astronomical signs and names of birds for letters of the alphabet. Today, cryptography is an exacting mathematical labor in which codebooks, cipher wheels, and typewriterlike cipher machines have given way to high-speed mainframes running complex algorithms.

Over time, the object of cryptography has been to transform a readable *plaintext* message into the apparent gibberish of *ciphertext* using a code that is as close to unbreakable as human ingenuity can make it. What has changed–changed enough to boggle the mind–are the codes themselves. Today's ciphers consist of layer upon layer of algorithms so complex that they test the wits of even the most powerful mainframes.

The computer is a natural tool in the field of cryptography. Souped-up number-crunchers like the Cray-1 can work their way through a mathematical labyrinth with greater facility than most people can complete a maze on the back of a cereal box. Surprisingly, though, it's the modest PC that is at the forefront of the cryptographic revolution. Some cryptosystems used on the PC are every bit as secure as anything generated on a high-powered mainframe.

Cryptosystems for PCs come in both hardware and software form. The federal government demands hardware encryption of confidential files in its agencies, presumably on the assumption that hardware is harder to tamper with than software; software schemes must be specially authorized. But those standards were set before PC systems and accompanying software options ballooned. PC owners may find that software implementation suits their purposes best. Hardware systems like the Encryptor, from Futurex, offer faster encryption than any software system, but software is usually less expensive and more reliable than hardware and doesn't take up a valuable expansion slot.

No code is uncrackable, but the software packages reviewed here–*DataSafe* from Trigram Systems and *Crypt Master* from Digital Signature–come as close to true infallibility as present technology allows. *DataSafe* is based on the popular federal Data Encryption Standard (DES), and

Crypt Master is modeled on the Rivest-Shamir-Adleman (RSA) public-key cryptosystem, the two leading supercodes of modern cryptography.

Mathematical sophistication aside, one alluring thing about these packages is that they're easy to use. Both are menu-driven and require no more than a few commands to encode and decode files. Their simplicity, together with their speed and the small amount of RAM they require, makes them ideal for securing electronic communications.

DataSafe

To be usable, a cryptosystem should fit easily into normal telecommunications routines. To be unobtrusive, it must be fast, performing its transformations within seconds. In this respect, Trigram Systems' *DataSafe* is a winner.

DataSafe, designed by Bob Lucas, is one of the best-conceived software adaptations of DES on the market. Both the program and the documentation are meticulously written. The program is chock-full of security features that would make even a blazing paranoid feel safe. Elaborate data authentication and checksum functions help detect any tampering with encoded files. Even the DES algorithm has maintenance tests, one of which runs automatically whenever the program is started. *DataSafe* encrypts and decrypts at 105K per minute—considerably faster than most other software versions of DES.

The actual encoding and decoding of files with *DataSafe* is ridiculously easy. To begin encryption, you type **E** at the main menu. Then, as prompted, you supply the name of the file to be encrypted, followed by a file name for the resulting ciphertext. A final prompt requests a secret key, a password that triggers decryption and encryption.

The security of files encrypted with DES depends on the infinite number of ways the algorithm can change plaintext into ciphertext. The secret key serves as the variable that establishes which cryptographic transformations will be chosen. Consider it the DNA strand behind the generation of a wholly unique secret code. Each time you use a new key you are actually generating a brand-new DES cipher with which to encode your files.

When entering your secret key, you have the option of using either ASCII characters or hexadecimal digits, the latter being more secure and the former easier to re-

member. The manual contains an eye-opening discussion of the advantages of hexadecimal over ASCII, and vice versa, turning the selection of the perfect secret key into a trial of your cunning.

For obvious reasons, secret keys aren't stored by *DataSafe*. Once you exit the program, they're gone forever, as are your encrypted files should you forget their keys. DES, like any other worthwhile cryptosystem, is designed to prevent reconstruction of secret keys from either the algorithm or the generated codes.

Transmitting a message or file encrypted with *DataSafe* isn't much different from transmitting an ordinary file, except that the receiver must have some hardware or software implementation of DES. The only other requirement is that your communications link be able to handle an encoded file's 8-bit characters. For this, Ward Christensen's Xmodem protocol works well.

To some, telecommunications is DES's Achilles' heel. The sender must find a communications channel secure enough to transmit the secret key without fear of its being intercepted. If for security reasons keys must be changed frequently, that could be a problem.

A natural question in evaluating cryptosystems is, if part of the ciphertext file is altered in storage or transmission, how far would the damage extend? How much of the file could you decrypt and how much would be lost? A good communications package picks up errors in transmission, but there is always the outside chance of disaster.

With *DataSafe*, encryption transformations are confined to relatively small blocks, so that any damage will run no longer than 16 bytes. The program offers an alternative ciphering mode that keeps damage limited to an 8-byte maximum by encrypting each block individually. By comparison, the default ciphering mode—cipher block chaining—encrypts by combining each 8-byte block with the previous ciphered block, making each block a function of all preceding ones.

The near impossibility of factoring this modulus and returning it to that one prime root that controls decryption accounts for the phenomenal strength of RSA ciphers.

Of the two methods, cipher block chaining offers the greater security. By adding random "noise" to the file, this method masks the structure of the file and conceals repeated messages such as strings of "yes" and "no," which, if left unguarded, could eventually be unscrambled.

Once a file exists in a ciphertext version, you must destroy the plaintext. Operating systems don't actually erase a file on command, but merely remove its name from the directory, allowing anyone of even marginal cleverness to resurrect it. *DataSafe* offers a Destroy function to overwrite and erase plaintext files. The complement to Destroy is Null, a function that the software author describes as a "paranoid thing to do but sometimes essential for maximum security." Null overwrites and erases all existing free space on a disk in case the program creates temporary files without the user's knowledge while he or she is working on a program with sensitive data.

Crypt Master

Despite the strength of the Rivest-Shamir-Adleman (RSA) public-key cryptosystem, public acceptance has been weak. The problem is its speed. Even on a dedicated microprocessor, RSA encryption and decryption can be frustratingly slow. That pretty much ruled out its use on a PC until a couple of mathematicians at the University of Chicago attacked the problem and came up with *Crypt Master.*

Crypt Master performs pure RSA at an encryption speed of about 1.25K per minute and a decryption speed of about 131 bytes per minute. That's adequate for short messages, but still too sluggish for anything longer than a paragraph. So the folks at Digital Signature designed slightly weaker versions of RSA that run at several times that speed and added a hybrid cipher for rapid encryption of long documents. The result is a series of fascinating packages, all deceptively austere but with a great deal to offer for PC security.

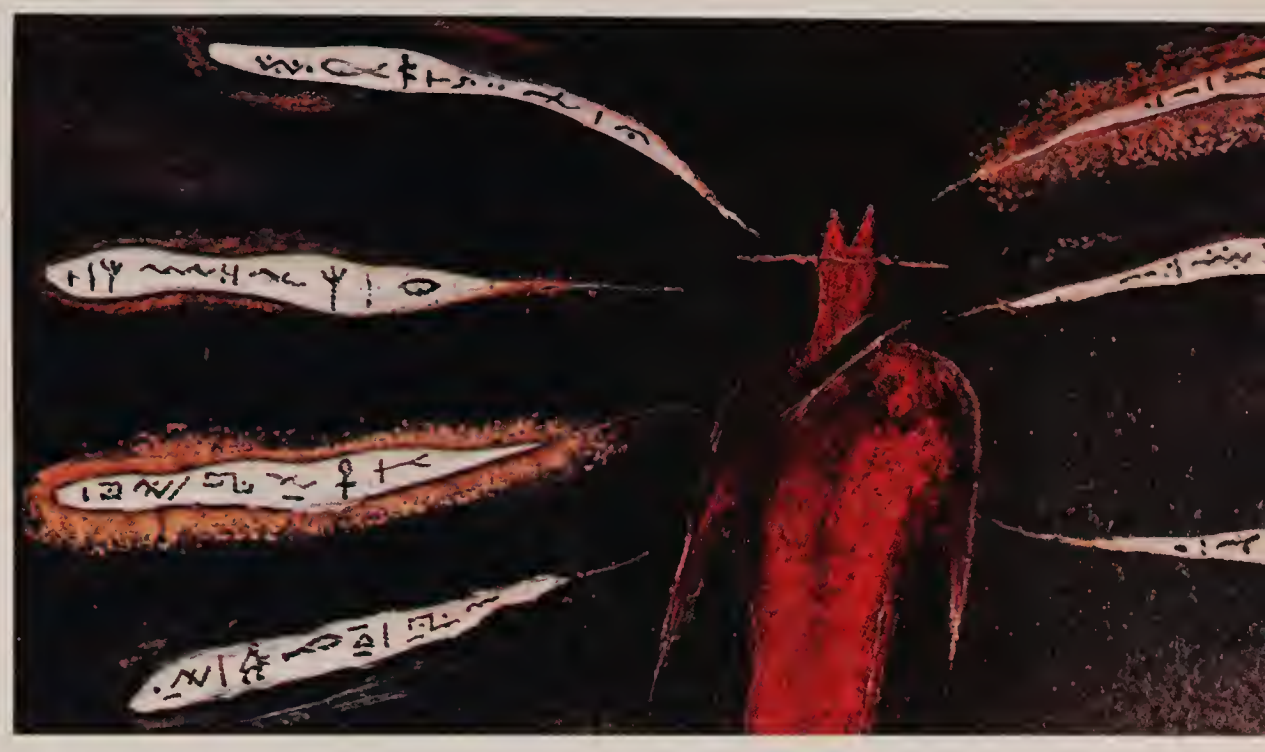
At the time of this writing, three different *Crypt Master* packages were available, with several more promised. They differ only in regard to code strength, based on the length of the *modulus*, which is the number that must be

factored to break the code. Codes generated with *Crypt Master/24* would take an estimated 25,000 years to break on an IBM 370/158, while those created with *Crypt Master/16* would take three years, and those with *Crypt Master/8,* no more than a few hours. But the stronger the code, the longer it takes to encrypt, as well as to break.

Steps to encrypt and decrypt files are elementary. You select the encrypt function from the main menu, then choose from user-created RSA ciphers listed on the screen. At the next prompt, you enter the name of the plaintext file, then a file name for the resulting ciphertext. As encryption begins, the screen displays an estimate and subsequent countdown of the total time required for the process.

As in the generation of DES ciphers, you supply a secret key to be chosen cautiously and guarded religiously. Once again, the program doesn't store secret keys, and there is no way to reconstruct them from either the RSA algorithm or the ciphertext it generates. And if you forget your secret key, your encoded files are lost.

To create a secret key, you type the chosen password. *Crypt Master* then requests that you hit a random series of keys. Which keys are struck is irrelevant—the program uses only the time intervals between keystrokes to establish a sequence of random numbers. These, along with the number derived from the secret key, are used as starting points in a hunt for two large prime numbers. Once two numbers, out of hundreds



tested by the program, are determined to be prime, they're multiplied together to form the cipher's modulus.

The near impossibility of factoring this modulus and returning it to that one prime root that controls decryption accounts for the phenomenal strength of RSA ciphers. Factoring such large integers is an area of number theory in which advances have been painfully slow over the past 100 years, and most mathematicians agree that the only foreseeable development will be proof that current factoring techniques are the best that can ever be achieved.

Even more than its strength, though, RSA's biggest selling point is its two-key system. Unlike DES, in which the secret key is used both to encrypt and decrypt, RSA uses the key only to decrypt and relies on a public key to encrypt. This effectively circumvents the problem of exchanging secret keys over a potentially insecure communications channel prior to the transmission of an encrypted message; the secret key remains safely in the receiver's hands. Since the public key contains no information that would allow someone to crack its cipher, it can be freely distributed, transmitted unguarded over phone lines, or even published in a company newspaper.

In order to transmit a file or a message with *Crypt Master,* you first encrypt it with the receiver's public key. The receiver must have a copy of *Crypt Master* with RSA ciphers that he or she has generated. After the receiver has acquired the enciphered message, he or she decrypts it with the secret key. Since the public key used to encrypt the file is linked to the receiver's private key, only the receiver can decrypt it.

This combination of public and private keys can be used to create *digital signatures* to certify the authenticity of messages. The process is a mite confusing, but effective nevertheless. First, by prior agreement, the sender uses his or her own secret key to *decrypt* the plaintext message. The usual procedure is then followed: The

sender encrypts the message with the receiver's public key, and after it is transmitted, the receiver decrypts it with the secret key. After decryption, though, the message is still unreadable, the result of the initial decryption of the plaintext. The receiver then *encrypts* the message with the sender's public key. If the message comes out readable, it's genuine, because the successful process proves the linkage of the keys used to encrypt and decrypt at both ends. If not, it's bogus.

RSA uses the key only to decrypt and relies on a public key to encrypt. The secret key remains safely in the receiver's hands.

Any communications protocol that handles 8-bit characters can be used to transmit files encrypted with *Crypt Master*. In case your communications software doesn't have this capability, *Crypt Master* contains an ASCII conversion utility that transforms encrypted files to 7-bit characters. Unfortunately, the routine doubles the length of ciphertext files, substantially increasing both the time and the cost of communication.

Should any errors crop up in ciphertext files during transmission, damage is confined to the encryption block in which it occurs. That's a 48-byte block with *Crypt Master/24*, a 32-byte block with *Crypt Master/16*, and a 16-byte block with *Crypt Master/8*.

At the time this article went to press, Digital Signature was in the process of finalizing a licensing agreement with Trigram, maker of *DataSafe*. Digital Signature will use *DataSafe*'s DES encryption routines in conjunction with its own RSA encryption scheme to create a hybrid code.

The main advantage of the hybrid is that it encrypts and decrypts at a considerably greater speed than pure RSA. At 105K per minute, the pace becomes practical for long documents. In comparison, *Crypt Master/24* encrypts

"We need Bob's spreadsheet in our report. NOW!"

NCR Corporation, Personal Computer Division, World Headquarters, Dayton, OH 45479. (513) 445-7478. For a dealer near you call 1-800-847-3800. In Nebraska 1-800-331-1000.

at 2.3 seconds per 48-byte block and decrypts at a snaillike 22 seconds per block. *Crypt Master/8* clocks in at over eight times *Crypt Master/24*'s speed, but even that pace is none too speedy. The relatively slow speed can give one reservations about using pure RSA routinely, but you may consider slowness an insignificant concession in light of the super-duper security that the program offers.

Crypt Master isn't a flashy program; the ingenuity that went into it is largely invisible. Its clearest failing is its documentation, which lacks background on several areas of concern to the reader. But that aside, the program is, if not a revolutionary achievement, a long-awaited advance in PC security, finally bringing RSA encryption up to an acceptable speed. *DataSafe*, though not as secure, still promises years of data secrecy, and its adherence to the accepted encryption standard makes it suitable for a broad range of encryption jobs—chances are anyone you'd want to send the file to would use that cryptosystem. Both programs offer advanced and easily implemented data security for your PC files.

Judy Getts is a freelance science writer in Wauwatosa, Wisconsin.

DataSafe
Trigram Systems
3 Bayard Rd. #66
Pittsburgh, PA 15213
412/682-2192
List price: $139
Requirements: 44K, one disk drive, DOS 1.10 or later version

Crypt Master
Digital Signature
5453 S. Woodlawn
Chicago, IL 60615
312/324-6533
List price: Crypt Master/24 $395, Crypt Master/16 $245, Crypt Master/8 $95
Requirements: 128K, one disk drive

The Encryptor
Futurex
9700 Fair Oaks Blvd.
Fair Oaks, CA 95628
800/251-5111
List price: $395-$895

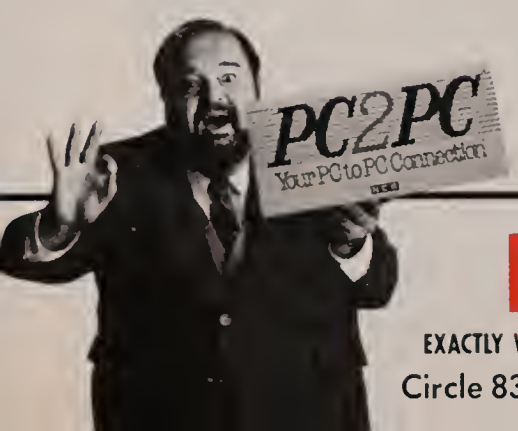
NCR's new PC2PC™ allows valuable information to spread rapidly throughout your office. PC to PC. Without the tedious, error-ridden task of rekeying documents.

PC2PC inexpensively puts up to 64 IBM-compatibles on-line to one another. NCR to IBM to Compaq. And that lets every connected PC share spreadsheets, files and databases.

PC2PC also lets you use fewer peripherals more efficiently by giving every PC in your office access to all your printers, plotters, storage devices, and more.

Get your PCs talking with new PC2PC. You'll see increased productivity from day one.

We'll bet you. Dollars to doughnuts.



Your PC to PC Connection.

NCR

EXACTLY WHAT YOU'D EXPECT FROM NCR.

Circle 834 on reader service card

PC2PC is a trademark of NCR Corporation.
©1985 NCR Corporation

ONLY PINWRITER PRINTERS CAN

Pinwriters are available in color models. So you can print in as many as seven colors.

The reason most people buy a dot matrix printer is for versatility.

And that's exactly why you should buy an NEC Pinwriter™ printer. Because a Pinwriter lets you do more than any other dot matrix printer.

Pinwriters are the final word in versatility.

With a Pinwriter you can print text in 3 different speeds—300 words per minute (wpm) for important word processing, 900 wpm for correspondence and memos, or 1800 wpm for drafts and spreadsheets.

You can create unbelievably clear graphics, too. Because Pinwriter printers produce an amazing 240 x 240 dots per inch in black and white. Or in seven crisp colors.

But that's not all. You can print in 8 different type styles. You can also feed forms automatically. Because NEC makes a wide range of easy-to-use forms handlers. Including a cut sheet guide, cut sheet

Pinwriter printers come in standard and wide carriage models. Both come with a forms tractor at no extra cost.

Circle 124 on reader service card

DOT MATRIX SAY ALL THIS.

"I CAN PRINT PICA HIGH SPEED.
OR PICA CORRESPONDENCE QUALITY
OR PICA NEAR LETTER QUALITY
OR ELITE CORRESPONDENCE QUALITY
OR ELITE NEAR LETTER QUALITY
OR PROPORTIONALLY SPACED CORRESPONDENCE
OR PROPORTIONALLY SPACED NEAR LETTER QUALITY
OR CONDENSED
OR ANY PROGRAMMABLE TYPEFACE"

Pinwriters print in 8 different typefaces at the touch of a button.

feeder and a bidirectional tractor.

And to make things even easier, Pinwriter printers work with almost every PC. And almost every piece of popular software.

All the controls at your fingertips.

Not only can Pinwriters do much more than other dot matrix printers, they're also much easier to use.

Press a button and you can change typefaces. Or speeds. Even spacing and pitch selection. And that's a refreshing change.

Of course, you can do it through your software, too.

"The quick brown fox
The quicker brown fox
The quickest brown fox"

Three printing speeds cover all your needs.

See your dealer for a quote.

For all this versatility you might expect to pay a bundle for a Pinwriter. Not so. Pinwriter prices are also easy to handle.

For more information, call 1-800-343-4419 (In MA call 617-264-8635).

And find out why more and more PC owners are saying, "NEC and me."

With Pinwriter, you can change spacing, type pitch, and speed with one finger.

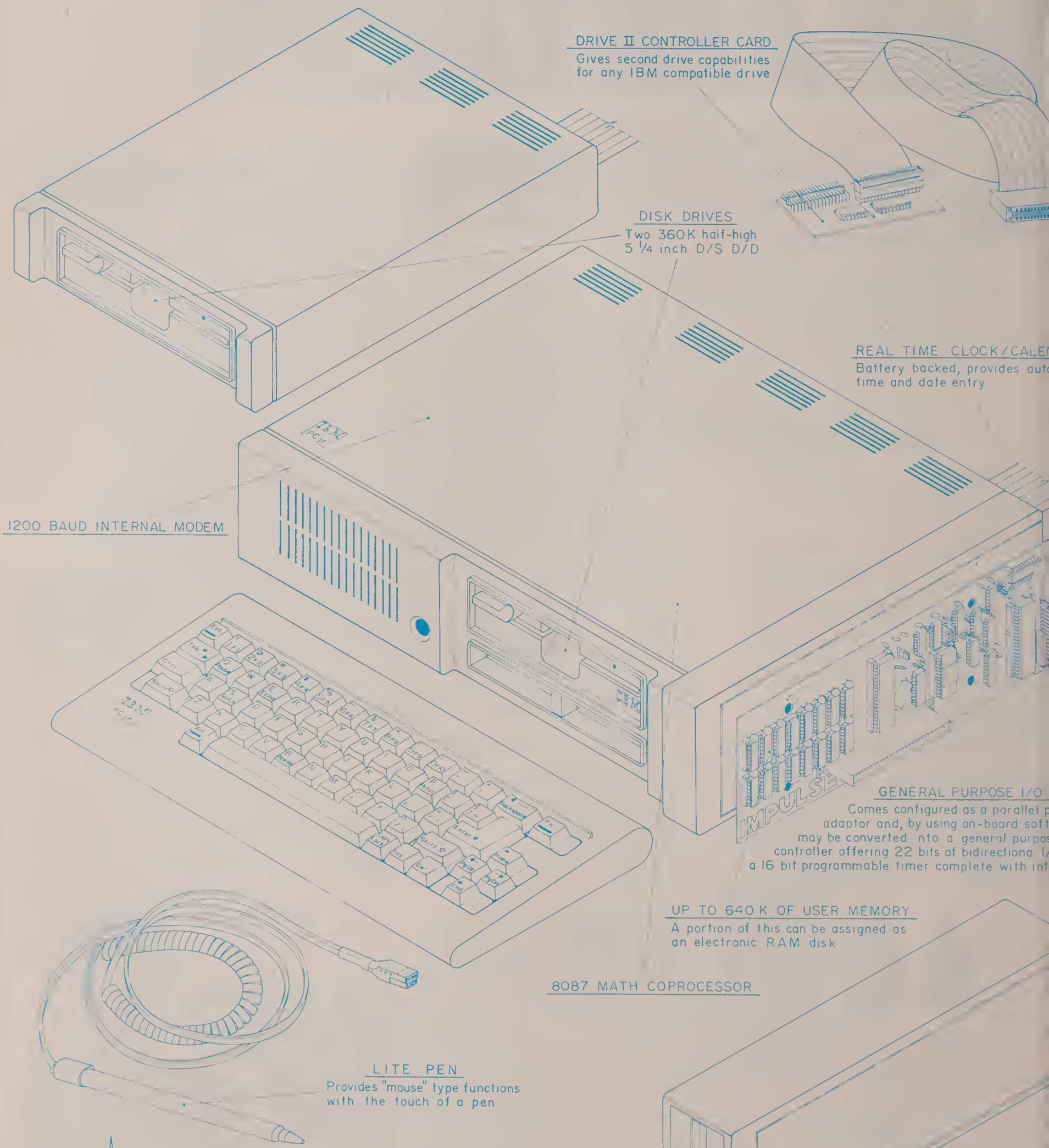
NEC AND ME

NEC Information Systems, Inc.
1414 Massachusetts Ave.
Department 1610
Boxborough, MA 01719

Pinwriter is a trademark of NEC Corp.

IMPULSE COMPUTER PRODUCTS

INVITES YOU TO REDISCOVER THE IBM PCjr.



IMPULSE
COMPUTER PRODUCTS

6337 South Highland Dr ve
Suite 114
Salt Lake C ty, UT 84121
(801) 562-5008

Circle 963 on reader service card

PCjr WORLD

May 1985

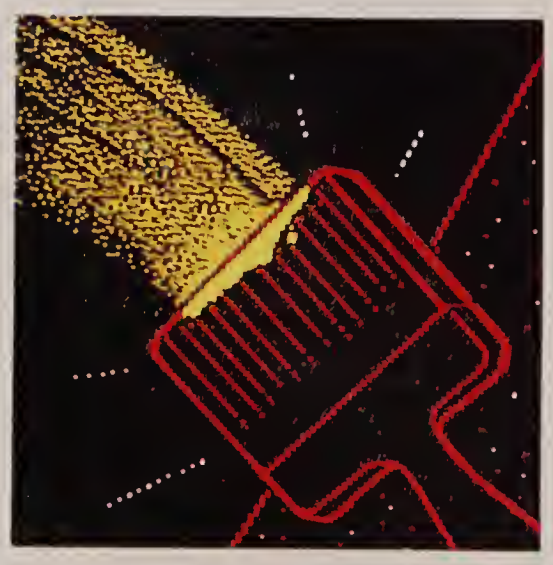
The PCjr Magazine

Jr Can Paint

If graphics are your pleasure, passion, or profession, look before you leap into the open arms of a Macintosh dealer. IBM's ColorPaint may change your mind.

Move Over MacPaint

Katie Seger and Peter Forde



People who sit down at an Apple Macintosh for the first time are almost inevitably drawn to *MacPaint*, Apple's tremendously versatile freehand graphics program that elicits "oohs" and "aahs" from the most jaded computer experts. After a few minutes' exposure to *MacPaint*'s interactive graphics and easily understood icons, even die-hard IBM PC fans are impressed. Aspiring Picassos find they can create competent pictures in minutes; professional artists quickly recognize the Mac's potential as an electronic canvas.

Yet the giddy aura that envelops all honeymoons must fade, to be replaced by the harsh realities of everyday use. Although most Mac owners remain faithful to their machines, many begin to have lust in their hearts: wouldn't it be great if *MacPaint* could work its magic in color?

IBM—anxious to resuscitate PCjr's then-listless sales—responded to that desire in the fall of 1984. Along with the welcome release of a new keyboard and several add-ons for the PCjr (see "PCjr Gets Bigger and Better," *PCW*, Vol. 2, No. 12), IBM announced the availability of *PCjr ColorPaint*, a cartridge-based program that capitalizes on the Mac's monochrome monotony and the PCjr's colorful talents—all for $99. To be fair, the real price of painting in color is screen resolution—PCjr's 640 by 200 pixels seem somewhat coarse when compared with Mac's 512 by 350.

Of Men and Mice

ColorPaint was not designed to compete with business graphics or computer-aided design (CAD) software. It is primarily a painting program, with built-in patterns and tools (such as a Zoom command) that make creating colorful pictures easy. Children and computer novices will enjoy *ColorPaint*'s ease of use and almost instant results. Amateur and professional artists on a budget will appreciate the program's sophisticated features that, for example, let you merge images, select the colors in the program's "palette," or replace the supplied patterns with those of your own design.

A two-button mouse (the Microsoft Mouse or Mouse Systems Corporation's PC Mouse) acts as the input device for most program operations. (To use the three-button Mouse Systems mouse, simply ignore the middle button.) Drawing with a mouse takes some practice, if only because it's a less familiar tool than a pencil or a pen. For small, detailed drawings a digitizing pad and a stylus are superior; they also enable you to trace drawings and designs from paper. But digitizing pads and their requisite software are rather expensive. (A mouse, serial adapter, and cable typically cost $225 or less.) If you aren't in the business of designing nuclear power plants, *ColorPaint*'s sophistication, ease of use, and double-digit price should make the tradeoff in precision worthwhile.

For detailed drawings, a digitizing pad and a stylus are superior to a mouse.

Most *ColorPaint* operations are triggered by Button 1 (the left button). A few of the more complicated functions are activated with Button 1 and executed with Button 2 (the right button). For the most part, the mouse is smoothly integrated with *ColorPaint* operations. Computer neophytes who played with the mouse under our direction caught on quickly.

Menus and Icons

Since *ColorPaint* is a cartridge-based program, no software installation is necessary. To load the program on an entry model PCjr, simply plug the cartridge into either slot and turn on the machine; if your PCjr has a disk drive, slip a DOS 2.10 disk into the drive, pop in a cartridge, and turn on the machine. Once *ColorPaint* is loaded, it displays a drawing area framed by icons, menu selections, and pattern choices. The mouse pointer is positioned at the upper left corner of the screen.

ColorPaint functions are accessible via six pull-down menus—File, Print, Edit, Text, Modes, and Tools. You touch a menu name with the pointer, then press and hold down Button 1 to display a pull-down menu (see Screen 1). Dragging the pointer through the menu highlights each selection; when you release Button 1, the highlighted function is activated.

From the File menu, you can save, load, or delete files on a floppy disk. (Opening files is permitted only if the PCjr is equipped with a disk drive). You select a graphics printer from the Print menu. Currently, *ColorPaint* can be configured for the IBM Compact, Graphics, and Color printers as well as the Quadram Quadjet and the Epson Graphics printers. Use of any other printer requires the installation of a special printer driver program. Program operations that manipulate images are selected from the Edit menu. For example, part or all of a drawing can be flipped from left to right or top to bottom. More important, you can merge images to create new pictures. To label a pic-

ture, you pull down the Text menu and choose text size (small, medium, or large); font (standard, roman, modern, or label); and style (plain, bold, underline, or italics). The Modes and Tools menus control such drawing features as brush shape and the use of grids.

Like *MacPaint*, *ColorPaint* uses a host of icons, which give the artist access to functions that create and manipulate images. Selecting the Brush icon makes available up to 15 brush shapes for painting solid or thatched swaths across the screen. The Pencil icon enables you to do free-form drawing; choose Line to draw the shortest distance between any two points. Use the faucet-shaped icon for filling in an outlined area with a color or a pattern. Click the Scroll icon, and you can scroll large images by as you would text with a word processor—a function vital for painting on a somewhat broader electronic canvas. Regular figures—circles, ovals, rectangles—are also easily generated, scaled, and moved.

When it comes to the fancy stuff, *ColorPaint*'s talents belie its modest price tag. For subtle or startling effects, click the Spray icon to turn the pointer into a spray gun that lays down solid colors or patterns. With a little practice you can even create an airbrush effect by spraying dark colors over lighter background colors. With *ColorPaint*'s Select function, you can capture all or part of a picture in a frame, then move, copy, merge, flip, or invert it. If detailed graphics or minute changes are called for, the Zoom function is particularly useful since it enlarges any part of an image.

With Mouse in Hand

Although learning *ColorPaint* requires some trial and error, the program's designers have taken pains to make menus and icons easy to comprehend and program features easy to use. For example, either/or menu options such as Fill Shape/Hollow Shape are marked with arrows showing which choice is activated.

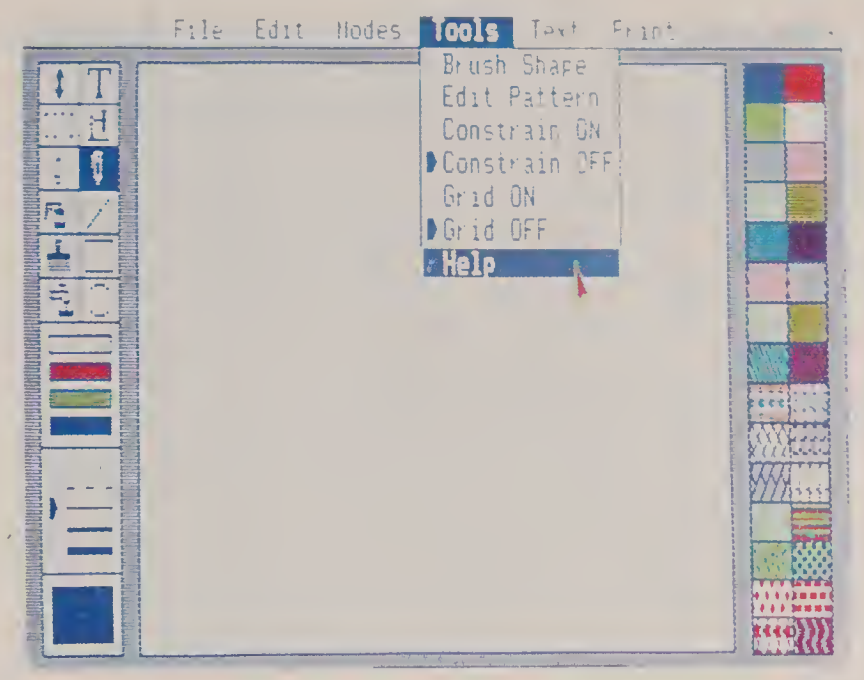
Selecting 'Help' replaces the drawing area with a help screen that clearly diagrams how icons, colors, line widths, patterns, and menus work together to create an image (see Screen 2). The diagrams also illustrate how color and pattern indicators are keyed to their respective functions.

This abundance of on-line help is needed because *ColorPaint*'s documentation is adequate at best. The Getting Started guide bends over backward to simultaneously enthuse and enlighten you, even chirping at one point, "You're about to become a graphic artist!" While this booklet sufficiently grounds you in *ColorPaint* fundamentals, taking you step-by-step through a picture-making tutorial, its gee-whiz tone begins to grate after the second page. Once you become familiar with the program, you need only refer to *ColorPaint*'s

A ColorPaint rendition of a photograph of two African tribespeople. The basic image was created with simple geometric shapes. Turning geometry into human form involved creating and interweaving custom patterns and then honing the picture in zoom mode, pixel by pixel.

reference guide, which offers clearly written descriptions of icons, menus, and menu options.

Before you open up this electronic paint kit, it's best to conceptually break down your picture into simple geometric shapes. *ColorPaint* generates geometric shapes quite readily, so those should be the first images you create. Once those basic elements are in place, switch to the Pencil or the Brush and begin some freehand drawing that connects and accentuates the geometric images, varying the line or brush size as needed. Once the picture starts to take shape, trim the rough edges in the Zoom mode. Then use either Fill or Spray to lay down color and patterns. Finish your creation by adding a message to the drawing with the Text function.



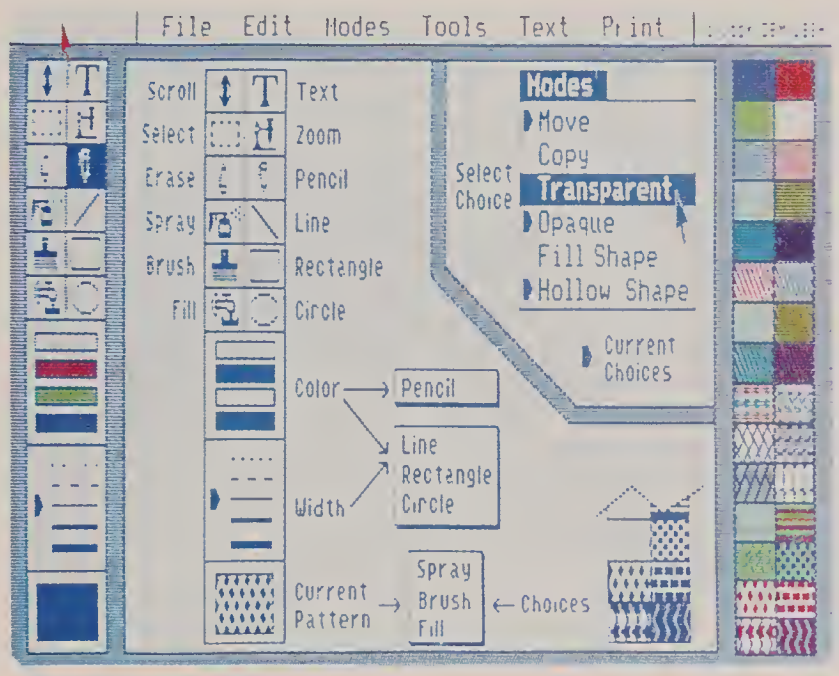
Screen 1: ColorPaint mimics the Mac. Point at a menu selection, click a mouse button, and a pull-down menu is displayed.

Digging Into the Paint Kit

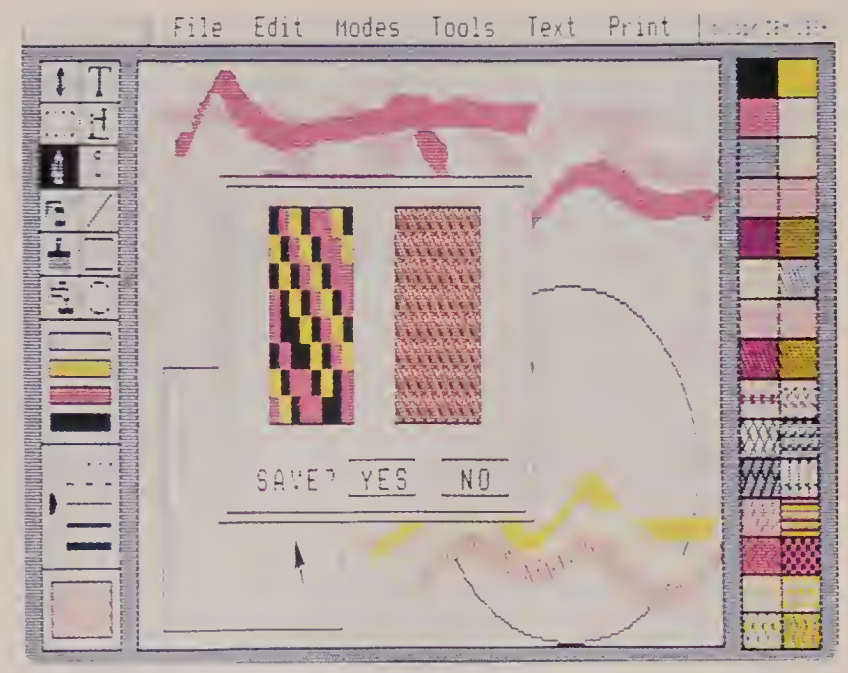
Most artists have a distinctive "signature," determined in part by the color combinations they use. Unlike other, more expensive drawing programs, *ColorPaint* does not impose a preset palette—color relationships are at the discretion of the artist. There are, of course, some restrictions. Only 4 of the PCjr's 16 colors can be used at one time, and 1 color must be white. Naturally, the palette you choose also defines the range of colors available for any pattern.

As noted earlier, a mouse is not the best device for creating small, intricate drawings, but *ColorPaint* partially overcomes this obstacle with its Zoom command. Much like *MacPaint*'s FatBits feature, Zoom magnifies a portion of a drawing so that you can erase or change its color or pattern by manipulating individual pixels. Under the Zoom command, the magnified area fills up most of the screen, and an in-scale "snapshot" of the drawing is visible in a small box in the upper left corner of the screen (see Screen 3). As you alter an image pixel by pixel, the changes are reflected in the snapshot. Like most *ColorPaint* functions, Zoom is simple to use.

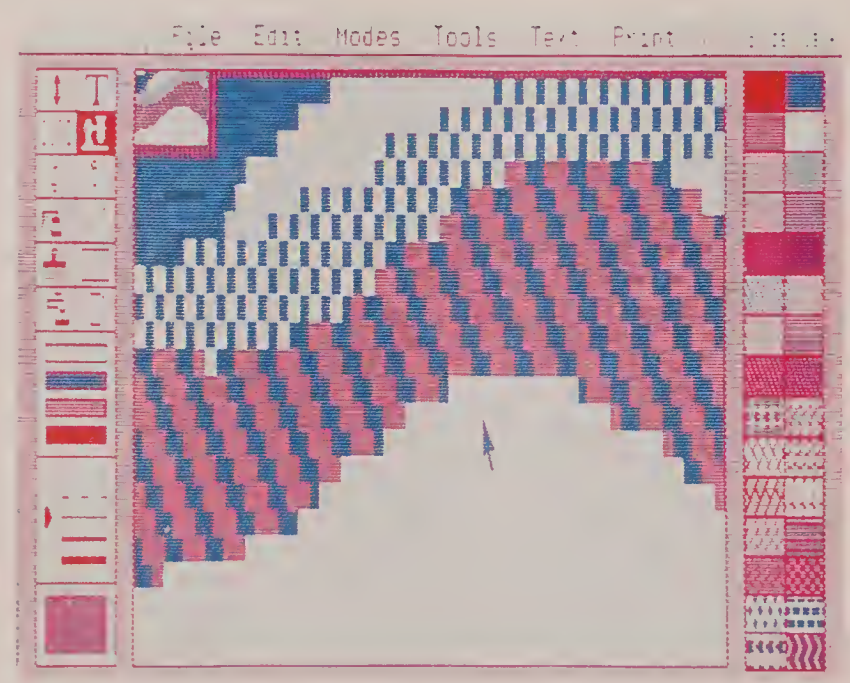
If one of *ColorPaint*'s provided patterns doesn't suit your taste, you can alter it in the Edit Pattern mode. In this mode, *ColorPaint* displays two fixed boxes in the drawing area (see Screen 4). As with the Zoom function, a portion of the selected pattern is magnified in the left box while the entire design appears in scale in the right box; as you make minute modifications on the left, the pattern on the right reflects the change. Edited patterns are saved to disk for use in other drawings.



Screen 2: ColorPaint's on-line help not only labels icons, but diagrams the interrelationships between icons, colors, patterns, and geometric forms.



Screen 4: The Edit Pattern lets you minutely change a pattern in the left box while the entire pattern appears in scale on the right.



Screen 3: Using the Zoom command in ColorPaint. One area of an image is enlarged for pixel-by-pixel work; an interactive snapshot in the top left corner shows the changes.

The Merge command from the Edit menu merges a section of one drawing with another full screen drawing. (The Merge command, like Copy and Move, can operate on only about one-quarter of the screen image at a time.) In this mode, the drawing that is overlaid by the other becomes the dominant drawing, retaining its palette colors and pattern selections. The resulting image can then be saved to disk under the original file name or another name.

ColorPaint's paint kit offers some interesting either/or options, in particular the Transparent/Opaque options, which give you the freedom to combine picture sections. When Opaque is set, the white areas in a section that is moved or copied to another part of the screen obliterate background images. The counterpoint option, Transparent, lets you create true overlays because any white space in a section appears transparent when the section is copied or moved, letting the underlying image show through. You could thus create a template image that could be overlaid onto many other images.

The Constrain On/Constrain Off and Grid On/Grid Off options on the Tools menu let you create more precise, professional-looking designs. With Constrain On, *ColorPaint* "corrects" any image you create, generating only true squares and circles when the Rectangle or Circle functions are activated. Likewise, when the Line function is active, the program draws lines at 45-degree or 90-degree angles. With Constrain Off, the same geometric functions will generate ovals, ellipses, rectangles, and straight lines at any angle.

In *ColorPaint*'s default mode, you can start a drawing anywhere in the drawing area. With the Grid option on, an invisible grid is laid on the drawing area; lines and other regular figures must start at a point on the grid. The grid is useful for aligning text or drawing equidistant parallel lines. Unfortunately, since the grid is invisible, you must discover the spacing between the lines comprising the grid—approximately ⅛ of an inch square—through trial and error. A more useful design would permit altering grid dimensions so that users such as architects and designers could choose their own scales.

Wish List

Our major gripe with the program is, in reality, a small one: The *ColorPaint* icons, menus, and pattern selections are constantly displayed on screen. It would be helpful to be able to toggle these images off and use the entire screen for the drawing area without the distraction of the tools lying about. And although these icons are not printed out, they get in the way when you create photographic slides from screen shots.

Although *ColorPaint*'s 15 brushes are more than adequate for most occasions, an Edit Brush option, similiar to the Edit Pattern option, would allow you to design additional brushes. Also missing is a function like *MacPaint*'s lasso, which enables you to "rope" irregularly shaped images so they can be copied, moved, and merged without nearby images intruding. *Color-*

Paint's Select function, which frames rather than ropes an image, is not always accurate and often captures part or all of unwanted nearby images.

Another desirable modification would be to make white an optional rather than a required member of

With Constrain On, ColorPaint *corrects any image you create, generating only true squares and circles.*

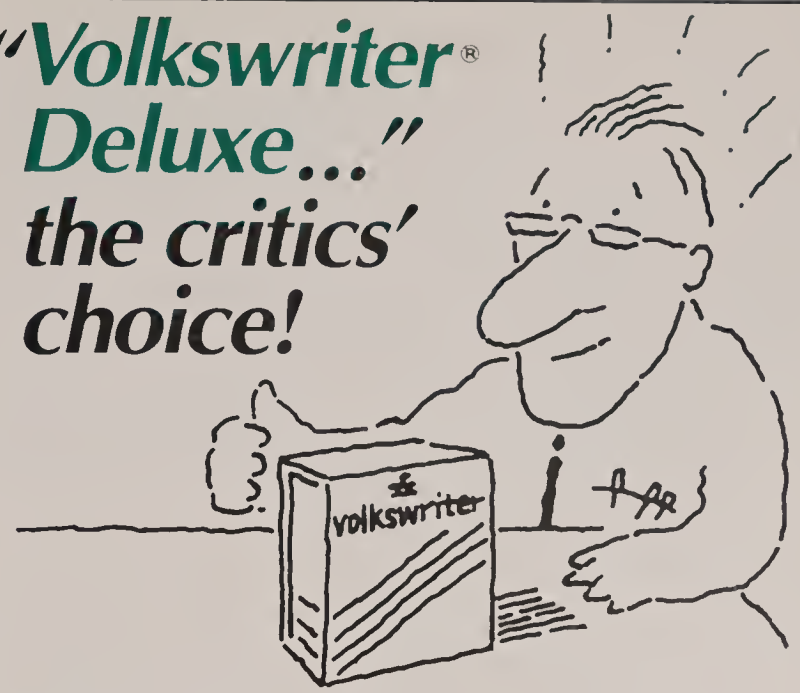
the color quartet. Though *ColorPaint* outshines many programs in terms of color flexibility, like most computer users, we're greedy.

These are admittedly niggling concerns. *ColorPaint* is very simply a bargain that budding electronic artists should strongly consider—particularly if their pocketbooks aren't deep. If you love the Mac's graphics but yearn for the colors of the rainbow, *ColorPaint* may just turn your head and change your mind.

Katie Seger is a San Francisco Bay Area freelance writer specializing in computer topics. Peter Forde is a commercial artist and company artist for Advanced Genetic Sciences in Berkeley, California.

PCjr ColorPaint
IBM
Systems Products Division
P.O. Box 1328
Boca Raton, FL 33432
800/447-4700, 800/447-0890 Alaska and Hawaii, 800/322-4400 Illinois
List price: $99
PCjr requirements: 128K, one disk drive recommended, serial mouse, IBM Adapter Cable for Serial Devices, color monitor

"Volkswriter® Deluxe..." the critics' choice!



"Thirty word processing programs were reviewed . . . no other program received a higher overall evaluation than Volkswriter Deluxe."
Software Digest Ratings Newsletter, January 1984

"If WordStar™ set a standard . . . Volkswriter Deluxe sets a new standard for transparency, simplicity, and speed. You can learn Volkswriter in under an hour . . . because it does so many things exactly the way you think they should be done."

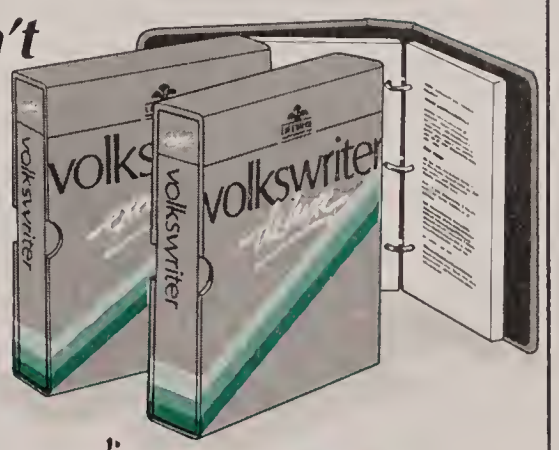
"VOLKSWRITER DELUXE is the best buy in the IBM-PC™ writing tool arena."
Charles Spezzano, Whole Earth Software Review, January 15, 1984

"Volkswriter Deluxe . . . a simple way to word processing power . . . for writers who like to think."
Washington DC Capital PC User's Group Vol. 3, #4

"Lifetree . . . provides exceptionally helpful and competent assistance to registered owners, and the company's update policies are excellent."

"In sum, this is a unique word-processing program."
John Lombardi, Reviewer, InfoWorld, April 16, 1984

We couldn't have said it better ourselves!



Suggested Retail Price: Volkswriter Deluxe $295 for the IBM-PC, PC compatibles, TI Professional™ and TRS-80 Model 2000™.

"simply amazing"

IBM PC is a trademark of International Business Machines, TI Professional Computer is a trademark of Texas Instruments. TRS-80 Model 2000 is a trademark of Tandy Corp. WordStar is a trademark of MicroPro. Volkswriter and the Lifetree logo are trademarks of Lifetree Software, Inc

© 1984 Lifetree Software, Inc

LIFETREE SOFTWARE INC.™
411 Pacific Street
Monterey, California 93940
(408) 373-4718 / TWX 176786

Circle 93 on reader service card

To err is human; to backup with Irwin, divine.

Let's face it—people make mistakes. And even when people are near-perfect, accidents do happen. Hard disks fail and software bombs. Power fluctuates and files disappear.

There isn't anything you can do to prevent the loss of information... except be prepared for the inevitable.

That's why we developed the Irwin BACKUP™ Tape Subsystem. It provides a fast, inexpensive way to copy data. So easy you'll use it every day.

Whether you own a PC-XT or the new PC-AT; whether you need to store 10, 20, even 40 megabytes of information, we have the backup for you.

The Irwin BACKUP is the perfect companion to your IBM PC-XT or PC-AT. It's color coordinated to match your PC beautifully. Small enough to fit conveniently on your desk, it comes with a self-contained power supply, and 30 times the storage capacity of a floppy. The tape cartridges are rugged, built to last.

Now there's no more crying over spilled milk (or short circuits). No more swapping floppies. No more costly mistakes. Because now the Irwin BACKUP Tape Subsystem backs you up with a heavenly combination: the reliability you need... for only $995.*

Irwin Magnetics has installed over 30,000 drives worldwide. We back you up with integrity.

For the dealer nearest you, call 1-800-421-2879 or write:

*Suggested retail price

Irwin Magnetics
2311 Green Road
Ann Arbor, Michigan 48105
313/996-3300

IRWIN™ MAGNETICS

Circle 5 on reader service card

BASF QUALIMETRIC™ FLEXYDISKS®. A GUARANTEED LIFETIME OF OUTSTANDING PERFORMANCE.

BASF Qualimetric FlexyDisks feature a unique lifetime warranty, firm assurance that the vital information you enter on BASF FlexyDisks today will be secure and unchanged tomorrow. Key to this extraordinary warranted performance is the BASF Qualimetric standard... a totally new set of criteria against which all other magnetic media will be judged.*

You can count on BASF FlexyDisks because the Qualimetric standard reflects a continuing BASF commitment to perfection in magnetic media. One example is the unique two-piece liner in our FlexyDisk jacket. This BASF feature traps damaging debris away from the disk's surface and creates extra space in the head access area for optimum media-head alignment. The result is a guaranteed lifetime of outstanding performance.

For information security that bridges the gap between today and tomorrow, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

**Contact BASF for warranty details.*

ENTER TOMORROW ON BASF TODAY.

BASF

© 1983 BASF Systems Corp., Bedford, MA

Circle 207 on reader service card

The Intelligent Decisionmakers

As an investor, your decisions depend on accurate, timely information.

The problem is that most of today's investment tools are based on outdated "guidelines" and unrealistic rules, so they can't give you the quality analyses you need to make intelligent decisions.

At HowardSoft,™ we create software that's appreciated by both the inexperienced user and the seasoned pro. Real tools for real decisions.

Real Estate Analyzer™

There's a terrific piece of property you'd like to get involved with. But what happens if interest rates rise, rents fall, inflation soars? HowardSoft's Real Estate Analyzer tells you with realistic projections under today's conditions.

Because HowardSoft knows taxes, your after-tax analyses of cash flow and profitability are based on real tax laws, not outdated rules.

And you don't have to be a computer whiz or a real estate expert to use Real Estate Analyzer. Well-planned menus, clear prompts, and a manual filled with examples help you get the most from the program (and your investment) and make it a veritable education in investment analysis.

Tax Preparer™

Your taxes affect every financial decision you'll make this year. With the mid-year tax planning supplement, HowardSoft's Tax Preparer lets you predict the year's taxes using actual 1984 tax tables. You enter information as it accumulates. Then each update lets you apply the data to the new tax forms in a matter of minutes.

Tax Preparer handles changes easily, calculates quickly and accurately, and—at the touch of a key—delivers error-free printouts ready to sign and drop in the mail. With crystal clear instructions, and the most used forms and schedules, no wonder Tax Preparer is the #1 selling tax program.

Intelligent Software

Both packages help make running your finances easier and more effective. Each works with either the Apple II series, the IBM-PC, or a select range of PC compatibles. Each does the work of software costing many times its price. And each leads the field in accuracy of information and ease of use.

Real Estate Analyzer and Tax Preparer.

Intelligent investment for intelligent investors.

HowardSoft.™

The software investment you can count on.

8008 Girard Avenue, Suite 310,
La Jolla, CA 92037 • (619) 454-0121

IBM is a trademark of International Business Machines Corporation Apple is a trademark of Apple Computer Inc HowardSoft, Tax Preparer and Real Estate Analyzer are trademarks of Howard Software Services

ITSoftware

Uniquely designed for business needs . . . integrated software for decision support *and* data processing

Most integrated PC software can provide the quick answers that managers need in day-to-day decision-making. Quick budget projections. A graph of sales.

But for serious business use, software must offer more. Full support for the data processing applications that form the heart of corporate computing. And links to mainframes where critical data often resides.

ITSoftware offers eleven full-function packages that can stand alone or work together to meet your business needs.

ITSeries Programs

KeepIT™, the core of the series, is a menu-driven relational data base management system that integrates your applications . . . lets you share data and calculations with other ITSeries programs, with other popular PC-based software, and with mainframe data bases such as Martin Marietta's RAMIS II.

AskIT™ is a KeepIT front end that provides data base power at the touch of a finger.

CalcIT™ offers advanced arithmetic and graphing features in a powerful 3-D spreadsheet.

WritIT™ is a private label release of MultiMate with the power of a dedicated word processor on a PC.

ShowIT™ provides state-of-the-art business graphics.

StatIT™ offers a complete array of statistical routines.

LinkIT™ is a menu-driven asynchronous communications package offering PC-to-PC or PC-to-mainframe links.

PassIT™ offers high-speed bisynchronous file transfers between an IBM mainframe and a PC.

SortIT™ is the fastest sort/merge utility available for a PC.

EditIT™ is a full-screen color program editor with easy-to-use windows.

CallIT™ offers a network-based telephone messaging and calendar program that's especially easy to use.

For IBM, IBM-compatible, and MS-DOS microcomputers.

Circle 81 on reader service card

ITSoftware . . .
ask for IT by name.

For more information, return the coupon below or call us toll-free at (800) 222-0592. In New Jersey, call (609) 799-7500.

We'll send you our free brochure.

Mail to: ITSoftware
P.O. Box 2392
Princeton, New Jersey 08540

NAME .....

COMPANY .....

TITLE .....

ADDRESS .....

CITY ..... STATE ..... ZIP .....

PHONE .....

PCM

MARTIN MARIETTA
Martin Marietta Data Systems

A Matter of Public Record

Local area network vendors may sell a lot of hardware, but LANs are lifeless without useful software. DATASTORE:lan heralds a new wave of multiuser application programs—and encompasses features essential for survival in a networked world.

Brad Baldwin

Scenario for the mid-1980s: News of a precedent-shattering lawsuit reverberates through the computer industry, capturing, in particular, the attention of local area network (LAN) software and hardware companies. A disgruntled user of a PC-based multiuser system wins a settlement against a firm that sold single-user data base management system (DBMS) software with its multiuser system.

The plaintiff successfully argues that the software is inadequate and inappropriate for use within his multiuser environment. He says it lacks such fundamental multiple-user features as shared access to data base files (without corruption of data) and user-defined data security measures. Performance is also severely compromised when large data bases are handled.

The plaintiff acknowledges that the hardware he purchased is quite powerful and that its operating system does indeed feature record locking, data privacy, and simultaneous access to the same file by two or more users. The system manufacturer, however, either knowingly or unknowingly misled him into believing that single-user DBMS software moved to a multiple-user system automatically incorporates multiuser features. Expert witnesses testify that many network protection and performance requirements for multiuser application software cannot be added to a single-user package.

The court deems that this is not a routine case of caveat emptor. The plaintiff isn't a novice but a person with years of computer experience. The judgment supports the plaintiff's contention that even experienced users are occasionally ambushed by new, relatively untried technologies and ought not suffer the consequences of an ill-advised purchase decision.

The problems that our frustrated but vindicated (and perhaps not entirely hypothetical) user encountered highlight an all-too-common misconception about local area networks—and the software needed to do meaningful work on them. Without the right software, using a LAN is akin to driving in a demolition derby: sooner or later, someone crashes.

Single-user application software on a network operates much as it does in a stand-alone setting. By necessity, such programs play it safe and don't share in the spirit of a multiple-user environment. If a single-user DBMS tried to genuinely inhabit a foreign LAN, data base files would quickly find the business end of a tow truck.

THE SEA OF INFORMATION

Put another way, single-user application software can offer concurrency, or access to a single file by multiple users, but it's concurrency at risk. True multiuser software promises protected concurrency. That promise is perhaps most critical, and most difficult to keep, in an application such as a DBMS.

There is, of course, an intervening layer between DOS and any application program—the network operating system. According to Larry Jordan and Bruce Churchill, in *Communications and Networking for the IBM PC* (Robert J. Brady Co., Bowie, MD, 1983), you can count on all network operating systems to contain four components: communications, input/output and file handling, user management, and application program support.

The network operating system integrates the network into DOS—more or less invisibly to the user—so that a standard single-user application program can run on the network without modification (although, again, not without risk). A network operating system can have various data protection "hooks," but unless the application program itself implements those hooks and uses them, data will remain at risk (see the discussion under "Waving the Flag").

Concurrent access protection

- ☐ Record locking
- ☐ Synchronization logic
- ☐ Data base structure protection

Data privacy

- ☐ Passwords
- ☐ Transaction privileges (read, write, update, and delete authority)
- ☐ Field-level privacy
- ☐ Record-level privacy (locks out categories of records to certain users based on field values)

Data security

- ☐ Encrypted user names and passwords
- ☐ Tamper detection: encrypted block checksum
- ☐ Audit trails
- ☐ Automatic data recovery techniques (rollback and roll forward)

Capacity/performance

- ☐ Megabyte-size data bases
- ☐ 100,000+ record capacity
- ☐ Dynamic garbage collection
- ☐ Multiple key fields
- ☐ Dynamically maintained B+ key trees
- ☐ Algorithms with minimal degradation when handling multiple users and large data bases

Figure 1: Use this checklist of features essential to multiuser data before committing your data to a LAN.

LANs Ho

Fortunately, software developers, perhaps inspired by IBM's foray into local area networking, are moving to end the drought in network application software during this so-called Year of the LAN (see "Six Leading LANs" and "Untangling Networks," *PCW*, February 1985). IBM, Microsoft, 3Com, and a horde of others are gearing up for a brisk business in LAN applications.

Whether this is *the* Year of the LAN or just a healthy time for networking, industry analysts concur that a boom is under way. The most conservative figure from industry gurus anticipates 100 percent growth over 1984, which would represent an addition of some 15,000 networks.

Several firms have already launched their entries in what is certain to be a new genre of relational DBMSs designed specifically for shared use on PC-based networks (see the sidebar "Share and Share Alike"). One such package on the cutting edge is *DATASTORE:lan*, a multiple-user relational DBMS from Software Connections of Santa Clara, California.

A multiuser DBMS such as *DATASTORE:lan* provides several essential features that clearly distinguish it from both a single-user DBMS and a multiuser DBMS lifted from a single-user environment. These include concurrent access protection, data privacy, data security, significant storage capacity, and optimized performance within a networked environment (see Figure 1). The challenge for Software Connections has been to fuse a useful sharing mechanism and a credible data manager.

Vital Statistics

DATASTORE:lan is a highly portable product. Although the program is not entirely hardware independent, Software Connections did minimal tinkering to create versions for 21 LANs, including the IBM PC Network, Microsoft Networks, Corvus Omninet, 3Com EtherSeries, Novell Netware, Nestar PLAN Series, Orchid PCnet, and Davong MultiLink. For purposes of this article, *DATASTORE:lan* was installed on TeleVideo's Personal Mini multiuser system, which supports up to 16 users and runs under InfoShare, a network operating system based on Novell's Netware.

DATASTORE:lan's true common denominator is the PC (or PC compatible) as workstation. The package requires that each PC on the network be equipped with at least 256K of RAM. Program files, including an extended report writer, consume nearly 600K, so the package is inexorably bound to hard disk-based systems (which does not constitute a drawback, because program files for virtually every network reside on a hard disk server). Up to 16 users are permitted simultaneous access to a data base; 127 users can be defined, each with different security classes (see Table 1).

Creating a data base, reading and adding records, performing searches, and formatting reports are all menu-driven tasks. *DATASTORE:lan* permits creation of up to 15 screens of data base input forms using an integrated full-screen editor.

The program uses a dynamically maintained B+, or balanced, tree structure technique to keep key field data in sorted order. (Briefly, a key index tree is a specific organizational structure used to search for data quickly—a critical concept for a relational DBMS.)

In setting up a data base, you can mark any field as a key and can specify up to 16 keys per data base. The program also performs "virtual" multifield key sorts (that is, a sort within a sort). A multifield sort accomplishes several levels of sorting with a single sort command. It arranges data in sorted order by a primary field, and within that field it sorts by a secondary field. The program would, for example, sort all folks named Johnson and then sort all Johnsons by city, then by zip code, and so on. The process is virtual, not physical, because *DATASTORE:lan* doesn't actually rewrite the data base.

A handy lookup feature can extract records from several data bases by searching for a field common to all. For example, if a customer identification field is contained in the customer accounts outstanding, credit history, and customer data bases, all three records pertaining to that identification number can be aggregated for viewing. You're spared having to jump from one data base to another.

Gauging Performance

The first PC-based data managers had no problem handling small numbers of records on floppy-disk-based systems. But a growing networked business may well need to store thousands of records on a hard disk; accordingly, algorithms appropriate for a stand-alone, 500-record, 100K data base won't suffice for a shared 50,000-record, 10MB data base. For a network product, this difference in size and scale eventually becomes a difference in kind.

DATASTORE:lan offers extensive storage capacity combined with efficient performance—both mandatory qualities in a network setting. The maximum allowable size of any given data base is 32MB; the program imposes no limit on the number of records per file as long as the total data base size does not exceed that maximum. DOS, as a single-user operating system, lacks a facility to properly handle the creation of files by multiple users. Conceivably, two users can create a file at virtually the same instant, writing to the identical spot on the disk—an unfortunate turn of events for the first user, whose work is overwritten by the second.

When you create a data base file with *DATASTORE:lan*, the program reserves an area on the disk that remains immutable for the life of the file. This process is known as "pre-allocation" and is essential to a multiple-user environment. Once the file is preallocated, its location on the disk will not vary; accordingly, updates can occur without other applications vying for that space.

Pre-allocation helps keep the data base contiguous and thus speeds up searches, sorts, and housekeeping functions within a data base of several thousand records. Pre-allocation minimizes the amount of disk space across which files can be dispersed; the hard disk read-write head can therefore perform at peak efficiency.

Ideally, multiuser software should be designed to minimize the amount of time one person can tie up the data base during sorts. Physical sorting techniques, which rewrite all records into sorted order, would obviously be inefficient in a multiuser DBMS of thousands of records. Because Software Connections chose to maintain sorted, dynamic B+ key trees on all key fields, sorts and record selection are almost instantaneous: a search for one record in a 1MB file requires less than 3 seconds. At your request, the program will retrieve records by the order in which they were entered or by keys. Or, if you're looking for a single record, you can invoke *DATASTORE:lan*'s Fastest Access Method to make short work of retrieval.

Garbage collection—the batch deleting of records and subsequent reclaiming of space—is fundamental to a large, shared DBMS. *DATASTORE:lan* performs dynamic garbage collection, immediately reclaiming and reusing the space occupied by the deleted record. As a result, garbage is not permitted to pile up.

The program's concurrent access protection capability ensures that all users on a network have an equal opportunity to read and update records within the same data file.

DATASTORE:lan lacks the kind of structured programming language that is built into *dBASE* and other DBMSs. Instead, Software Connections sells a separate application development tool kit called *LAN:Datacore*. Designed primarily for professional programmers, the *LAN:Datacore* library routines are invoked from the user's choice of Pascal, Compiled BASIC, or FORTRAN.

A Matter of Concurrency

Once you've structured a *DATASTORE:lan* data base, the program's concurrent access protection capability becomes paramount. That capability ensures that all users on a network have an equal opportunity to read and update records within the same data file; that data integrity is maintained through "record locking," which precludes other users from changing a record while it is in use; and that the key tree structure is not altered by simultaneous users.

Single-user DBMSs, by contrast, do not permit simultaneous reading and writing to the same data base. Such programs as *R:base 6000*, the multiuser version of *dBASE II* (which was recently discontinued in favor of a pending multiuser version of *dBASE III*), and even many UNIX-based DBMSs do not support record locking. Typically, these programs enable only one user at a time to access a file—a condition known as "file locking." File locking is inappropriate for a data base that requires frequent input from different users. A file-locked data base denies everyone else access until the user in possession of the lock completes his or her task and exits the file. In a data base file that permits concurrent access, record locking and key tree structure protection are necessary to safeguard the data base from corruption.

Consider the inventory control nightmares that Consolidated Bottle Caps would encounter under concurrent access without record locking. Suppose Smitty, a clerk, calls up a parts inventory record so he can reduce the total bottle cap count by 30; Moe, another clerk, calls up the same record but wants to add 10 bottle caps to the count. Smitty updates the record to the disk, and Moe does likewise shortly thereafter. The outcome of these two transactions should result in a net decrease of 20 bottle caps from inventory, but instead, Moe's update writes over Smitty's, effectively voiding it. Based on the numbers, Consolidated believes it has 30 more bottle caps than actually exist.

Record locking would prevent Moe from modifying a record that Smitty was using; the record would be unlocked once Smitty moved on. *DATASTORE:lan*'s record-locking feature would not prevent Moe and Smitty from concurrently reading the same record, although if Moe were the second user to attempt a read, he'd receive a message that the record

Table 1: Multiuser data managers at a glance

	DATASTORE:lan (Software Connections)	reQuest (System Automation Software, Inc.)	Informa (Unlimited Processing Inc.)
Data base size	32MB	133MB	8MB
Record size	16,384 bytes	4096 bytes	8190 bytes
Records per file	unlimited	65,000	65,000
Fields per record	512	255	8190
Pages per data base form	15	5	255
Key fields	16	16	50
Simultaneous users	16	dependent on LAN operating system and hardware	dependent on LAN operating system and hardware
Assigned users*	127	unlimited	unlimited
Files open concurrently	15	100	unlimited

* Maximum number of user names and passwords monitored

was in use. If, however, Smitty updated the record and exited, Moe would receive a 'record locked' message were he to attempt an update immediately. The procedure requires that he exit the record, reenter it–which retrieves the newly updated record–and then continue his business.

Waving the Flag

The responsibility for record locking does not belong solely to the application program. Although no network operating system provides automatic record locking, virtually all include a "semaphore," a tool that flags a file or record as locked or unlocked. Semaphores help *DATASTORE:lan* perform disk allocation tasks and provide access synchronization logic (which converts simultaneous attempts at access into serial events that DOS can handle). Both capabilities enable multiple programs or users to update files concurrently.

Some LAN vendors imply that record locking in a network operating system automatically ensures concurrent access and data privacy for any software package. By themselves, however, semaphores are useless at protecting data; the application program must invoke the semaphore in order to lock records and keep data private. (Interestingly, a few network operating systems include an automatic file-locking feature. A user of such a network who is running *DATASTORE:lan* or any application program that incorporates record locking must first invoke a command to disable the file-locking capability.)

DATASTORE:lan's dynamic maintenance of key trees is another major part of the record-locking process. Essentially, the program automatically updates the key tree structure when records are added, deleted, or modified. Structure protection insulates the key trees from damage by enabling only one user at a time to create, update, or delete a record. Without such safequards, an entire data base could be quickly scrambled.

Who's Got a Secret?

Data privacy features are vital to the health and welfare of any multiuser DBMS, particularly because a LAN's shared hard disk may host confidential company data. All network users are not created equal, and it's the network system manager's charge to govern access to certain files, certain records within the file, and even certain fields within a record. More

Share and Share Alike

Wes Nihei

The boom in the local area network marketplace echoes an explosive surge in the development of application software designed specifically for networks. Joining *DATASTORE:lan* in the multiuser DBMS arena are *Informa* from Unlimited Processing and *reQuest* from System Automation.

Both of these relational data base managers offer concurrent access with file and record locking. Data privacy is provided through ten levels of security at the file, record, field, and transaction levels, and audit trails are created for each record. According to both manufacturers, the number of users permitted simultaneous access to a data base is limited only by the network operating system and the LAN hardware.

Informa was designed to be a multiuser data base for personal computers in a business environment. It uses a balanced tree structure to keep key field data in sorted order. The maximum data base size is 8MB, with 65,000 records allowed per file. *Informa* performs multiple sorts and retrieves data on 50 key fields.

A $49 utility program called LOADUP loads ASCII text, DIF files, or any fixed-length record file into an *Informa* data base. In addition, a Programmer's Interface, priced at $200, uses Pascal MT+ to create special applications. *Informa* supports IBM's PC Network, Orchid PCnet, Microsoft Networks, Novell Netware, Ungermann-Bass Net/One, 3Com EtherSeries, Corvus Omninet, Davong MultiLink, and TeleVideo InfoShare.

reQuest, originally developed for IBM mainframes, uses ISAM (Index Sequential Access Method) to provide nonsequential indexed access to data. The company claims a maximum data base size of 133MB, with 65,000 records per file. Fields can be up to 80 characters in length, but you can enter longer passages of text by repeating the field name up to 25 times. A special function called Question Mark Processing lists the values or translations for field names for any user who may not be familiar with the data base. Information can be retrieved with multiple sorts on 16 key fields.

With its built-in Text File Conversion utility, *reQuest* will import and export files in ASCII, DIF, and SYLK formats. Unlimited Processing offers a command language interface for *reQuest* but no programmer's tool kit, on the premise that a nonprogrammer can do with the program virtually everything a programmer can do. *reQuest* supports Orchid's PCnet and 3Com's EtherSeries LANs.

The market for multiuser application programs is scarcely limited to data base managers. Scouting out the multiuser milieu is Lotus Development, which plans an enhancement to *Symphony* that will enable it to perform securely and efficiently in a networked environment.

frequently, the system manager assigns passwords and gives the yea or nay on who can read, write, update, or delete records within the data base (see Figure 2).

DATASTORE:lan covers the bases, providing data privacy at the file, record, field, and transaction levels. At the file level, access can be achieved via a system of user identifiers and passwords. Down a notch is privacy at the record level, where a manufacturing manager, for example, might be restricted to reading only her employees' records. Down another notch is field-level privacy, which denies general access on one or more fields or restricts access by certain classes of users within a company. Personnel matters might well come under the realm of field-level privacy.

DATASTORE:lan *makes a stab at enforcing data security. This is done primarily via encryption and dispersal throughout the disk of all user names and passwords.*

Data privacy is at its most exacting at the transaction level; it often signifies the most limited read-only access. Some users, for example, may need only to view data base records without modifying them; others will be granted selective read/write authority but not update and delete rights.

To determine the private or public status of a given data base element, *DATASTORE:lan*'s privacy system relies on a menu-driven security form and a set of relational operators (see Screen 1). These include mathematical symbols such as =, <>, <, and <=, plus character symbols such as *P* (prefix), *XP* (not a prefix), *S* (suffix), and *C* (character string). The result is what the company calls field masking. The data base creator might, for example, key in = *QA* before a department classification field, indicating "allow the user to see only those records equal to Quality Assurance departments." An *XP DOD* located on an account field might mean "allow the user to see only those records not beginning with the accounting prefix *DOD* (Department of Defense)." Records can be omitted from view based on data held in multiple fields, not merely a single field.

Imposing field-level privacy requires the single character *X*, which tells the program to "cross out" the given field. In Screen 1, an *X* placed before the salary and birth date fields would restrict certain users (selected by the data base creator) from viewing those fields.

Privacy in a shared environment is a slippery issue, however, and the methodology for *DATASTORE:lan*'s delete authority is not airtight. Permitting someone update authority but forbidding delete authority doesn't necessarily achieve its aim: the "no delete authority" designation simply disables the Erase Record command assigned to a function key. The result is that an ill-intentioned user with update authority could erase data in every field in a record one at a time, effectively deleting the entire record.

Hacking Around

Data privacy techniques aren't much good if the network user gains access to the data base through DOS commands. Joe MacHacker might decide to increase his salary by a few decimal places, search out a password, change parts numbers in an inventory, or—shudder—trash several key data bases in the wake of a dismal performance review.

All networks must grapple with ways to prevent unwanted access to a data base through accidental or intentional circumvention of the application program. Once a user is at the operating system level, the application software can do very little to prevent tampering through the back door. The DOS DEBUG program provides the classic means of entering a file, automatically searching for a particular hexadecimal or ASCII data string, changing bytes, and generally gumming up the works (see "Program Patchwork," *PCW*, March 1985). Other programs in general use can read and write to any byte located on any volume, track, and sector of a disk.

DATASTORE:lan makes a stab at enforcing some semblance of data security. This is done primarily via encryption and dispersal throughout the disk of all user names and passwords. In addition, 2 bytes from each 512K block of data are reserved for an internally encrypted block checksum. If something outside the program forces a change in the block—such as data tampering or a power failure—the data base is rendered unavailable for use until the system manager can clear the problem with *DATASTORE:lan*'s Clearusr utility.

Clearusr verifies data base integrity and can display a particular block with a problem, but it cannot pinpoint the problem to specific bytes. Through a series of menu prompts, the system manager can update any faulty blocks.

In addition to encrypted passwords and tamper detection, *DATASTORE:lan* also creates a simple audit trail for each record. During normal data base operation, all new records and record modifications are stamped with the time, date, and name of the last user to alter the record. In essence, an audit trail is an automated fingerprint system that remembers who last touched the record.

What Else Is in Store?

The emerging multiuser DBMS market is helping unleash the power inherent in local area networks. For too long, the old saw has applied with a vengeance: hardware must continually await appropriate software. Concurrent access, data privacy, data security, prodigious storage capacity, and optimized performance remain an elusive but essential combination for PC LAN application packages. Single-user DBMSs can't perform safely or efficiently under in-

```
   Name:

Address:

   City:                          State:        Zip:        -

  Phone:    (   )    -     SS#:     -  -      Birth date: X   /   /

 Hire date:       /  /     Employee #:          Marital status: X

Department: =   Sales    Start salary: X  $00000  Current salary: X  $00000

Press <Esc> to select a command, or use function keys

F1-Help   F2-X Out                                    F9-Continue  F10-Go Back

Choose  =, <>, <, >, <=, >=, P(refix), XP, S(uffix), XS, C, XC, or X

                                                          1 B:EXAMPLE2 UTILITY
```

Record privacy Field privacy

Screen 1: The data base creator or the system manager can limit access to fields or records by using a data privacy utility. In this example, the user is not allowed to view the birth date, marital status, or any other field marked with an "X"; the user can access only those records that have "sales" written in the department field.

tensive shared use conditions. Neither can single-user DBMSs ported to a multiuser environment; many are makeshift, either ignoring or not fully implementing record locking, data privacy, and security features.

The next generation of network application software is likely to draw on data security features now common in minicomputer DBMSs. These data recovery techniques are known as "before imaging," "rollback," and "roll forward." Such capabilities can prevent data loss during a power failure or return a corrupted data base to an uncorrupted state.

On 8088/8086-based personal computers, such recovery features add overhead to the system, proving a drag on the DBMS. On the 80286 class of chips, however, recovery tasks can be performed without adding a significant burden to the data base. Accordingly, expect recovery features to make their mark in multiuser applications written for this new breed of CPU.

DATASTORE:lan represents a new wave of LAN applications. It's a largely successful attempt to build a multiuser DBMS from the ground up, respecting both network and data management needs for data accessibility, reliability, and integrity. LAN software is surely a wave capable of delivering network users safely to shore.

Brad Baldwin is a partner at Sheehan/Baldwin/Campeau Communications, a high-technology writing firm in Fremont, California. He served with IBM and Osborne Computer in engineering and technical support positions.

(continues)

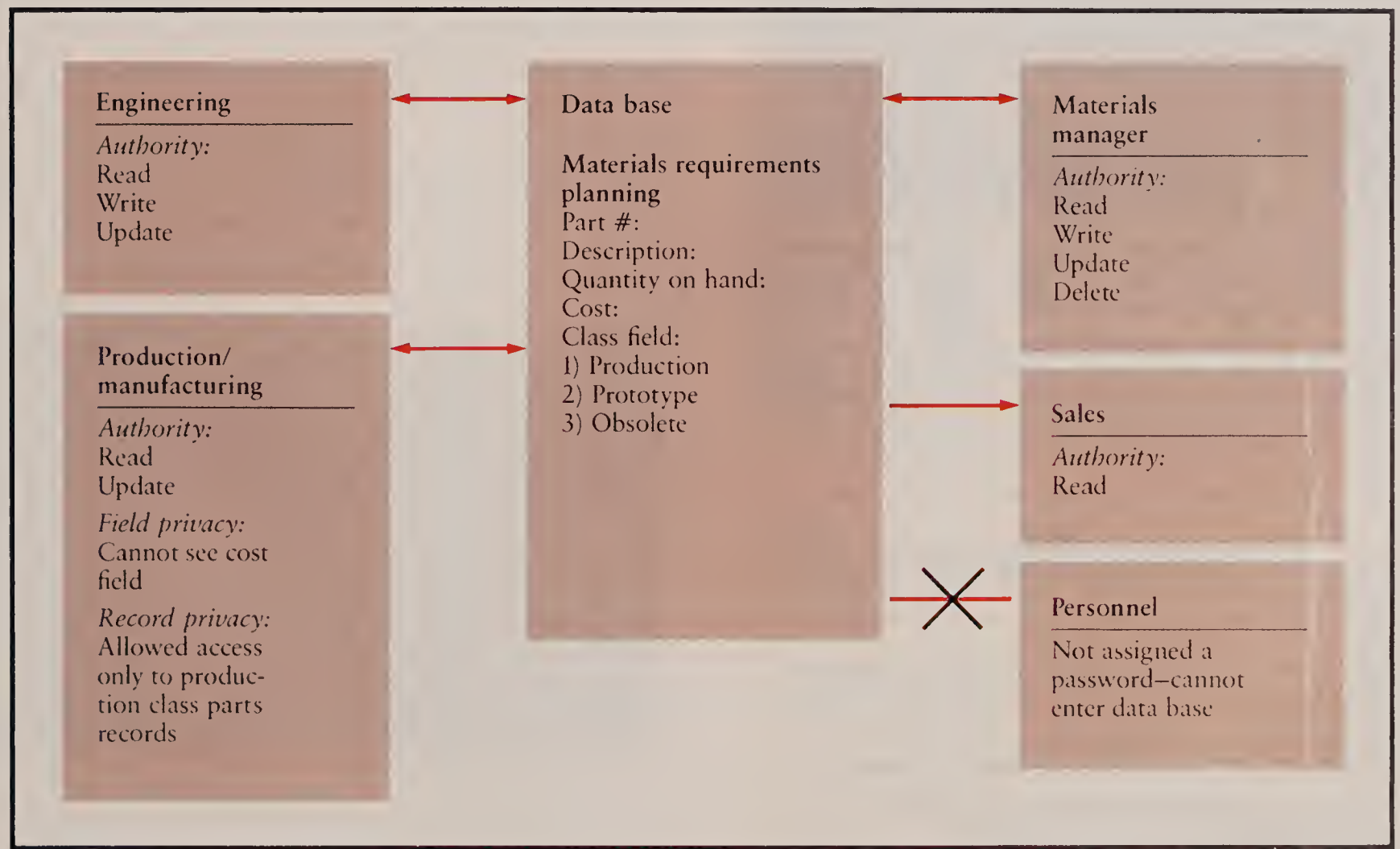


Figure 2: Sample MRP data base illustrates multiuser data privacy: Different departments can be assigned various transactional authorities (read, write/enter new records, update, delete), as well as file-, record-, and field-level access privileges.

THE HARD ONE IS RIGHT TO FIND!

We've Got it at

ALPHA OMEGA

COMPUTER PRODUCTS

TURBO 10®

HARD DISK PACKAGE $949.00

- TURBO 10 is a 10 MB hard disk system, designed for the IBM PC®, to achieve IBM PC/XT® capacity, and full PC/XT compatibility.
- Access seek time 300% faster than IBM PC/XT® hard disk.
- Ideal with the use of serious application programs, such as Ashton-Tate™, 1,2,3 and Symphony™, Micropro Wordstar, etc....
- 13 month defective exchange policy, covering both parts and labor.
- TURBO 10 comes complete with all necessary interfacing and cabling, professionally written installation and user documentation.
- Speed, Convenience, Affordability, and Reliability...at Alpha Omega Computer Products we put it all together for you.

Corporate purchase orders are welcome. Please call for personal service on terms and quantities.

MasterCard

Contact your local dealer, and ask for the TURBO 10. or call:

VISA

(213) (818) 345-4422

18612 Ventura Blvd., Tarzana, CA 91356

All products are pre-tested before delivery, and are guaranteed for 13 months. Within this period, defective returns must accompany an RMA number. All other returns subject to a 10% restocking fee. Please include $6 for shipping and handling. There will be an additional $4 surcharge on COD orders. Calif. residents include 6.5% sales tax.

Circle 930 on reader service card

DATASTORE:lan
Software Connections
2041 Mission College Blvd.
Santa Clara, CA 95054
408/988-0300
List price: 5-user version with quick report $945, with extended report $1140; 16-user version with quick report $1945, with extended report $2140; extended report writer upgrade $195; LAN:Datacore application development tool: 5-user version $945, 16-user version $1945
Workstation requirements: 256K, one disk drive (hard disk recommended for network)

Informa
Unlimited Processing Inc.
8382 Baymeadows Rd. #8
Jacksonville, FL 32216
800/874-8555, 904/731-8330
List price: $599
Requirements: 256K, two disk drives

reQuest
System Automation Software, Inc.
8555 16th St.
Silver Spring, MD 20910
301/565-9400
List price: $1495
Requirements: 384K, two disk drives

NEW

A powerful multifile database with a programming language for only $99

Versaform's new XL database isn't just promises—it's here now! And it offers—YES, FOR ONLY $99—all the features you'd expect in a database costing 4 times as much.

Accounting applications are XL's strength. Invoicing, purchasing, receivables, and shipping almost create themselves as you design the forms—and XL transfers data between them. There's an Invoicing, A/R and Inventory application—source code included—in the package that shows how it's done. The power's there. And unlike packaged accounting programs, you can do them YOUR way.

	VersaForm XL	dBASE III*	R-BASE 4000*
PRICE	99	695	495
STRUCTURED LANGUAGE	Y	Y	Y
MULTI-FILE	Y	Y	Y
COLUMNS WITHIN DATA RECORD	Y	N	N
DATA ENTRY CHECKING	BUILT-IN	MUST WRITE PROGRAM	BUILT-IN
ON-SCREEN CALC	BUILT-IN	MUST WRITE PROGRAM	MUST WRITE PROGRAM
FORMS OUTPUT	BUILT-IN	MUST WRITE PROGRAM	MUST WRITE PROGRAM
DATE ARITHMETIC	Y	Y	N
DATA TYPES	DYNAMIC	FIXED	FIXED
COLUMN TOTAL OPERATOR	Y	N	N
QUERY BY EXAMPLE	Y	N	EXTRA
MAX FILE SIZE	4 MB	OPEN	OPEN
MAX RECORD SIZE	4000	4000	1530

*dBASE III is a registered trademark of Ashton-Tate. R:BASE 4000 is a trademark of Microrim, Inc.

- XL's structured language can access multiple files. 48 built-in functions give control of file access, printing, and user dialogues. You'll develop transaction-based applications with an ease you've never experienced before. And all at this unheard-of low price.
- VersaForm XL's unique form-oriented data structures let you easily set up forms and ledgers—even those with columns! Application development is FAST, FAST, FAST. And since forms are the way that businesses already store their data, the transition is smooth. That's why VersaForm XL is so easy to operate even for high-turnover clerical people—it starts from where they are now.
- Automatic data entry checking and on-screen calculation make transactions error-free. Stored print formats make output formatting a snap—you can quickly match existing paper forms. VersaForm XL's report generator is clear and intuitive. Designers can pre-install reports, users can set up their own.
- Query-by-forms (at no extra cost) lets users go right to the data they need. No query language to learn—forms are the natural language of business.

Ironclad Money-Back Guarantee

Try VersaForm XL for 30 days. If you're not fully satisfied, return it. We'll gladly refund your money.

Order now, and have the pleasure of using the right tool at the right price. You can't lose!

VersaForm XL runs on IBM PC, XT, AT and compatibles. Requires 192K, two 360KB drives, DOS 2.0 or later. Hard disk recommended.

Standard VersaForm (single file, no language) available for 64K, 2-drive Apple II or 128K IBM PC. $69.

VersaForm™ XL

Applied Software Technology
(408) 370-2662
Dept. PW-5, 1350 Dell Ave., Suite 206,
Campbell, CA 95008

Yes! Rush me Versaform XL for the IBM PC ($99) ____
Standard Versaform (Single file, no language) for the IBM PC ($69) ____
Apple II (+,E,C) ($69) ____
Credit card members can order by phone. VISA

Toll-Free: 1-800-824-8145 ext 880
In California
Toll-Free: 1-800-854-4448 ext 880

Enclose check or money order with coupon. Include $4.50 for U.S. Shipping and handling. $7.00 for C.O.D. California residents add 6.5% tax.
____ My check or money order is enclosed ____ Send C.O.D.
Charge my ____ MasterCard ____ Visa
Account No._____ Expires_____
PLEASE PRINT CLEARLY
Name _____
Address _____
City_____ State_____ Zip_____
Phone_____ Signature_____

Circle 12 on reader service card

Tactics for Teleconferencing

Teleconferencing combines the flexibility and economy of electronic mail with the direct communication of a conference call. An effective teleconferencing system can make the PC the most cost-effective communication route to headquarters and around the world.

Lisa B. Stahr

When a group of Bechtel International employees went to Papua New Guinea to build a gold mine, they took along an unusual tool: a computer conferencing system. Rather than communicate via telephone or Telex, which Bechtel brass deemed too time-dependent and costly, the team relied on their personal computers to exchange messages and reports with co-workers at corporate headquarters in San Francisco. The Ok-Tedi Gold Mine was finished faster and more economically than planned, and project managers cite the efficient communications as a key to the project's success.

The term *teleconferencing* has been used to describe a broad range of business communications systems, but true teleconferencing systems can accommodate a number of people on line simultaneously and send stored-and-forwarded messages. The most

sophisticated systems allow conferences on several levels; a main conference can include subconferences, each with different participants. Some systems have data base management capabilities that allow participants to search for messages by contributor name, date, or time and to print a record of each conference. Most systems include an on-line work space and a simple word processor for message preparation. Several levels of security are offered to ensure the confidentiality of communications.

If the Bechtel workers in New Guinea had come up against a problem that only experts in San Francisco could remedy, without a teleconferencing system the company would have had two choices: fly the experts to the site or arrange for a conference call to New Guinea. In the second case, headquarters would probably have needed to send supporting documents by express mail. Both options would have been expensive.

Not every business can profit from a full teleconferencing system; effectiveness depends on the business's size and telecommunications habits.

A teleconferencing system, though, provides a third option. Assuming a main conference (maybe entitled "Project Ok-Tedi") was already set up, Bechtel could then create a subconference devoted to the specific problem (perhaps called "Uncontrollable Seepage") and arrange for the experts and the on-site personnel to communicate on line. In a give-and-take exchange, the workers could describe the problem in detail, including actual figures and even diagrams; the San Francisco staff could ask questions about methods, geography, geological conditions, and equipment.

The experts in San Francisco could then research the problem and brainstorm with associates. When they found a solution, they could send the information via the network. The workers in New Guinea would check the subconference "Uncontrollable Seepage" to find detailed instructions awaiting them. Over the course of the project, on-site personnel could periodically search the conference data base by contributor name to find any new messages from specific personnel, or by date to refer to a past message.

Choosing the System

At the center of any teleconferencing system are a host computer and software that together store, retrieve, and disseminate the information that callers submit (see Figure 1). The computer may range in size and power from an IBM PC XT to a minicomputer or a mainframe. The software is the most crucial factor in designing a teleconference.

Two kinds of teleconferences are available: those set up and maintained by teleconferencing services, such as InfoMedia's Notepad and The Source's Participate, and those you create in your own office. Creating and operating your own teleconference is usually less expensive than using a teleconferencing service. Signing up with a service, however, gives you more features and the comfort of knowing that your conference is in the hands of professionals.

Before you choose which type of system to use, evaluate your teleconferencing needs. How many people will participate in the conference? Will the participants be local or will they be calling from all over the country or the world? How many topics will be discussed? Will the participants make frequent contributions, say every day or two? Likewise, consider the importance of security. Will the conference include confidential or classified information? Will you want a record kept? Will you need a data base created from the contributed material?

Not every business can profit from a full teleconferencing system; effectiveness depends on the business's size and telecommunications habits. To find out whether your firm could benefit from such a system, take a few minutes to complete the questionnaire in the sidebar "Do You Need a Teleconference?" If your communications requirements don't warrant the cost of a subscription to a teleconferencing service, a less sophisticated system, set up with PCs and an electronic mail program, might be in order.

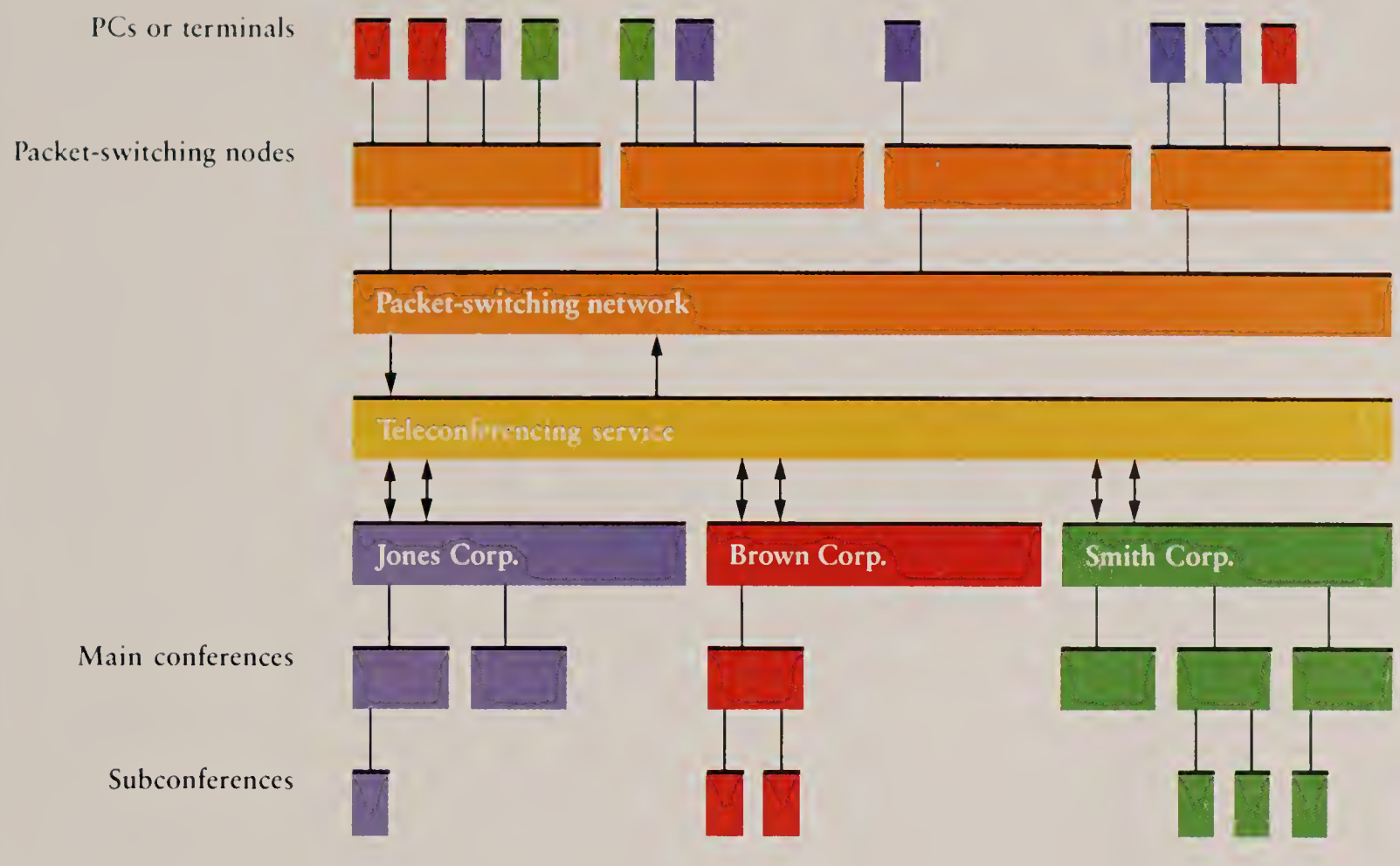


Figure 1: Remote callers use their PCs as links to a centralized teleconferencing service. Communications are routed through packet-switching nodes to the service's central computers, where the contributed information is organized and accessible. Private teleconferencing systems work in much the same way, except each company routes information to its own central computer, which generally has less sophisticated software.

Do-it-yourself systems range from basic electronic mail software, which provides unattended operation for sending and receiving messages, to integrated electronic mail packages, which may also include word processing and text data management features. PC-based teleconferences offer only a narrow choice of options. None allow real-time conferencing. Few include a searchable data base, and some can't save messages for more than two days. Most have fairly loose security, a flaw you can't afford if your discussions are confidential. To acquire the full range of teleconferencing features, including on-line interactive teleconferencing, you'll have to subscribe to a teleconferencing service.

Teleconferencing Services

Each of the major teleconferencing services has an area of specialty: Notepad is business-oriented, geared specifically to the project management and operational requirements of a company; Confer, from Advertel Communications, caters to government agencies and associations; New Jersey Institute of Technology's Electronic Information Exchange System (EIES) appeals to academic and computer-oriented users. Participate, from The Source, is the least esoteric of the teleconferencing services, primarily because it was developed to serve the long, multifaceted list of Source subscribers.

Each of the major teleconferencing services provides all the features necessary for effective teleconferencing. In addition to electronic mail and real-time conference capabilities, they can tabulate votes cast during conferences.

The services vary, however, in a few important respects. Notepad and EIES allow 36 and 40 conferees on line at once, respectively, while Confer per-

mits 350 and Participate, none. (There is no on-line communication within Participate; callers must use The Source's Chat mode to talk on line.)

Likewise, the services differ in the amount of data security they offer. Participate and Confer, designed to let users move easily from one conference topic to another, are easier to breach than EIES or Notepad. All incorporate several levels of password protection. Notepad and Confer offer encryption as well. EIES allows the conference leader to program up to ten questions that participants must answer correctly in order to join a conference. For example, "2 + 2 = ?" might require the answer "387"; any other answer would indicate a possible intruder.

An important factor in deciding which service is best for you is the computer expertise of the people who will use it.

Another important factor in deciding which service is best for you is the computer expertise of the people who will use it. Are your conference participants computer novices? If so, EIES's technical bent may scare them away, whereas Participate or Notepad, systems designed to be used by computer neophytes, may be inviting.

Counting Costs

For all the pluses that a teleconferencing service offers, there is one big minus: the bill. Costs range from a low of $7.75 an hour (Participate in nonprime time, using a 300-bps modem) to a high of $60 per hour (Notepad). Also take into account sign-up fees (anywhere from $100 to $1000) and packet-switching network access charges ($2 to $25 per hour). One Notepad client estimated that a system would cost his company $5000 a month, with 80 participants logging on every two days, for a total of 30 minutes on line per person per week. That may seem like a lot of money, but weigh it against your firm's monthly telephone, overnight delivery, postage, and travel expenses.

If you want a full teleconferencing system but don't want to pay the hourly rates, you can license the commercial teleconferencing systems for use in-house. The Confer system, for Amdahl V8 minicomputers with the MTS operating system, can be licensed for in-house use for about $25,000; EIES, the granddaddy of all computer conferences, is available for Perkin-Elmer Interdata computers at $35,000; InfoMedia will let you use Notepad for $50,000, for use with any DEC System 20 running the Tops 20 operating system; and Participation Systems, the creator of The Source's Participate, will license its teleconference for $20,000 ($10,000 for educational institutions). Participate runs on DEC VAX, Prime Series 50, and Honeywell DPS 6 computers.

As you can tell from the prices, only firms with serious teleconferencing needs (and minicomputers) should consider licensing a system. If your numbers are small (less than ten), and your participants are located near one another or their calls are infrequent, then a "do-it-yourself" system, set up with a PC XT or AT, might be the best teleconferencing vehicle, especially if you don't require any special features or security measures.

Software for PC Systems

Most teleconferencing services enable you to communicate with other conference members in real time, like in Chat mode on The Source or with CB simulation on CompuServe, and send messages through electronic mail. A PC-based system won't give you that option. However, Mary Evren, account manager for InfoMedia, points out that only 20 percent of Notepad's time is used for real-time communication; the other 80 percent is used for sending and receiving electronic mail (see "In Box Out Box" and "Electronically Yours," *PCW*, Vol. 2, No. 6, for a description of the features available in electronic mail software).

The closest you can get to a true teleconferencing system on the PC is by using an integrated electronic mail package like *MIST+* from New Era Technologies (see "The Communicator's Tool Chest,"

Do You Need a Teleconference?

Here is a 5-minute evaluation test. Circle the number corresponding to the answer that applies to your organization.

How are messages being sent now?
1) Ordinary mail and face-to-face meetings.
2) Telephone calls.
3) Telex and telegrams.
4) No method fully satisfactory.

How much money could be lost if a typical message is lost or late?
1) Less than $1000.
2) Between $1000 and $5000.
3) Between $5000 and $15,000.
4) Over $15,000.

When you send a message, how many people need to see it?
1) Fewer than 5 people.
2) 5-10 people.
3) Over 10 people.

Where are the other group members located?
1) In the same building.
2) In the same city but different buildings.
3) In different cities but the same country.
4) In different countries.

What is the nature of the issues or information exchanged?
1) General ideas, not related to decisions.
2) Policy and high-level issues.
3) Technical support decisions, technical management.
4) Operational decisions.

What is the purpose of a typical message?
1) To keep others informed.
2) To request information.
3) To alert others to new developments or problems.
4) To make specific assignments.

When you send a message, how important is the reply?
1) Not important.
2) Nice to have.
3) Influential upon the outcome.
4) Vital to the project or group.

How important is it to have project information "on record"?
1) It would be better to keep most information private.
2) Some information should be recorded to facilitate tracking.
3) All information should be on record for better management.

Add up the values of the numbers circled. If your score is:

8-14 You do not need a teleconference.
15-19 A teleconference would be nice to have, but you can do without it.
20-24 Your organization could greatly benefit from a teleconference.
25-30 You have an acute need for a teleconference.

From the book Computer Message Systems *by Jacques Vallee (McGraw-Hill, 1984).*

PCW, Vol. 2, No. 11). *MIST+* combines electronic mail, word processing, and data base management functions. With *Conexus,* the program's optional teleconferencing module, you can easily set up a system that has many of the features offered by commercial teleconferencing systems. You can accommodate 900 participants and assign up to eight security access levels. The software is inexpensive for a teleconferencing system, but even with *MIST+* you can't chat on line. You have to call up the system, create and send a message, log off the system, wait for the message to be received and a reply to be sent, and then call up the system again to read your mail and send a response.

Another option is a bulletin board host system like *Hostcomm* from WBS and Associates. A host system lets remote users leave messages and access files on a personal computer. With the *PCE-Mail* and *Conference* options, *Hostcomm* sets up an effective teleconferencing system much like Participate, including an elaborate password system to ensure the security of messages.

Once the System Is Chosen

You might think that once you've chosen a teleconferencing system your work is finished. Not so. You must make arrangements within your company to assure the smooth operation of the system.

First, you need to ensure that every potential participant has the proper telecommunications equipment: a computer or terminal, a communications program compatible with the host system, and a modem, preferably one capable of operating at both 300 and 1200 bps.

If conference participants are scattered around the state, the country, or the world, you will also need a packet-switching network (Telenet, Tymnet, and Uninet are the top three). If you subscribe to a teleconferencing service, packet switching is provided. Packet-switching networks keep conference members' phone bills down by allowing conference access with a local call instead of a long distance call. The caller dials the local packet-switching number and keys in the appropriate access number. The network then connects the caller to the host computer. The network—not the caller—pays the charges, and the network's charges will be lower than conventional long distance rates. Another benefit is that data transfer is faster with packet switching.

The Job of the Mediator

After the equipment and the software are in place, the structure and content of the conferences themselves must be decided. The job of shaping each conference usually falls to the *conference mediator.*

One of the mediator's first duties is to construct an agenda for the discussions, as for any business meeting. Past conferences have shown that the more goals a conference has, the more successful it will be. If you are using a professional teleconferencing service, the mediator can plan complex structures for conferences, with subconferences centered around each main conference. For instance, you may have a main conference entitled "Increasing Corporate Productivity," for discussing ways to boost company output, with subconferences for each department. Department members could continue to contribute to the main conference while participating in their department subconferences. The mediator must carefully consider how many subconferences to permit—especially if the company is using a teleconferencing service, since costs increase with the number of conferences.

The mediator also establishes a membership roster, including the names of all conference participants and the level at which each will participate. Some conference members might need access only to get information contributed by others, not to contribute information themselves. Those people would be assigned read-only status. Others who need to read and contribute would receive read/write privileges. Most teleconferencing services provide for several additional security levels. The mediator also decides which participants need to review past information and to pass private as well as public messages.

One of the mediator's most important jobs is to keep discussions on track: keeping comments pertinent to the appointed topic, editing the record when necessary, and encouraging reticent participants to contribute. Some conferences, says Evren, take off on their own and need a mediator only to pull in the

reins. In fact, one of teleconferencing's biggest problems is that people digress from the topic. An attentive mediator can prevent this from getting out of hand.

Choosing a teleconferencing system is only the first step in creating a successful teleconference. Thoughtful planning and tight control will ensure consistent participation and high-quality entries—and greater efficiency and productivity for your project.

Lisa B. Stahr is a freelance writer in Palo Alto, California, and the author of Communications for the IBM PC and XT *(Simon and Schuster/PC World Books, San Francisco, 1985).*

Software

MIST+
New Era Technologies, Inc.
2025 I St. NW #924
Washington, DC 20006
800/368-5787
List price: $495, Conexus $195
Requirements: 256K, two disk drives (hard disk recommended with Conexus), serial port, modem

Hostcomm
WBS and Assoc.
P.O. Box 2462
Fairfax, VA 22031
703/978-0866
List price: $170, Conference and PCE-Mail modules $80 each, $125 for both
Requirements: 128K, two disk drives, serial port, Hayes Smartmodem

Services

Notepad
InfoMedia Corp.
801 Traeger Ave. #275
San Bruno, CA 94066
415/952-4487
Fees: initial charge $1000, access to Tymnet $7 per hour, usage $60 per hour

EIES
New Jersey Institute of Technology Computerized Conferencing and Communications Center
323 High St.
Newark, NJ 07102
201/645-5211
Fees: membership charge $75 per month; access to Telenet $3 per hour nonprime time and $9.50 per hour prime time, through special arrangement

Participate
The Source
Source Telecomputing Corp.
1616 Anderson Rd.
McLean, VA 22102
703/734-7500
Fees: initial charge $100; usage $7.75 (300 bps), $10.75 (1200 bps) nonprime time and $20.75 (300 bps), $25.75 (1200 bps) prime time

Confer
Advertel Communications
2067 Ascot Rd.
Ann Arbor, MI 48103
313/665-2612
Fees: subscription available through Telenet for approximately $20 to $25 per hour

On-Line Search Strategies

Tapping into the immense store of data in electronic libraries can be an overwhelming experience, but a few basic search techniques help relieve data overload and improve search results.

Barbara Newlin

A PC is a great deal more than a word processor, a financial analyzer, an expensive toy, or even a tax write-off. It is also an information conduit that can access huge amounts of data for you to browse through, interrogate, or manipulate. Connected to an on-line service, a PC can help you make strategic business decisions, gather statistics and marketing intelligence, research a doctoral dissertation, keep up with the news, plan your securities portfolio, read about that drug your doctor just prescribed, or satisfy your curiosity about almost anything you can name.

Getting the information you want is a matter of finding the right service and data base. This requires some thoughtful preparation and a basic familiarity with informational data bases and the searching process. You also need to learn how to build an elementary search strategy. The following are some basic tips that should improve your results while you search data bases on many of the major on-line services.

The on-line searching process is interactive; you interact with the host system, trading questions and answers with the computer on which the data base is stored. Once you are connected to a data base, you enter a command requesting a search for a particular word or phrase. The host computer responds, telling you how many times that word or phrase occurs. On the basis of that information, you may decide to add more terms or combine the terms in some way. The process is repeated back and forth until you find the information you are looking for. Then you read, download, or print the data; end the search; and leave the system.

Searches can be performed with varying levels of sophistication. For example, you could perform a very simple search in the PTS PROMT (Predicasts Overview of Markets and Technology) data base by entering the single word *videotex*. Or you could locate information on U.S. sales and consumption data for personal computers with the command:

S PC = 3573098(L)EC = 65(L)CC = 1USA

These codes for microcomputers (3573098), sales and consumption (65), and country (1USA) can be found in the Predicasts user manual.

Every on-line service has a set of basic commands that allow you to retrieve and manipulate information in a simple, straightforward manner. In addition to these elementary commands, there are

advanced commands that enable you to do more refined, complex, or time-effective searching. They are not essential but are rewarding to use when your skills improve. Meanwhile, you can do a perfectly adequate search if you have a good grasp of the basic commands that allow you to select a term, combine terms, and display or print the information you find.

Boolean Operators

Aside from simply entering a single term, the most basic technique of on-line searching is combining terms or sets of retrieved information by using three words: *AND*, *OR*, and *NOT*. These words are also known as Boolean operators, taken from the system of logical mathematics known as Boolean algebra.

The function of Boolean operators is illustrated in the following search example. Let's say that you're an accountant interested in reading about accounting applications for microcomputers. You de-

cide to search the ABI/INFORM data base, which covers hundreds of business and management journals. After logging onto Dialog Information Service, one of six services on which ABI/INFORM is available, you enter **B15** (for "begin file 15," the identifying number for the data base). Once in the data base, you select the term *microcomputers* as a subject descriptor. The Dialog computer then roams through ABI/INFORM, searching for all occurrences of the descriptor *microcomputers* and shortly returns with the message in Screen 1.

This message tells you that there are 2016 records in the data base to which the descriptor *microcomputers* has been assigned and that they have been assembled into a workspace identified as set 1. (A record is a single unit of information in the data base, usually a reference to an article or some other type of publication.) If you want to display or print all 2016 records, your search is finished. However, it is likely that you want to make the search more specific. Perhaps you decide to limit the search to accounting applications. You can add this new concept by selecting the subject descriptor *accounting*, creating a second set. Next you combine it with the first set by using the AND operator, creating a third set that represents the intersection of sets 1 and 2. All records in this third set contain both of the terms you've selected: *accounting* and *microcomputers* (see Screen 2).

If you want to exclude articles on software, you could select the descriptor *software* as set 4, then use the NOT operator to eliminate it in set 5 by combining set 3 NOT set 4. All the records in set 5 contain the descriptors *accounting* and *microcomputers*, but none contains the descriptor *software* (see Screen 3). Adding the concept of accounting reduced the number of records from 2016 to 42. Eliminating software reduced it again to 28.

The OR operator is used when you want to expand a set to include various terms that express the same idea. For instance, the concept of accounting could be expressed with words like *accoun-*

```
File15:ABI/INFORM - 71-83/Dec
(Copr. Data Courier Inc.)
        Set Items Description
        --- ----- -----------

? S MICROCOMPUTERS/DE
          1  2016 MICROCOMPUTERS/DE
```

Screen 1: A simple search in Dialog's ABI/INFORM data base. The system responds that there are 2016 records in the data base with the descriptor "microcomputers."

```
File15:ABI/INFORM - 71-83/Dec
(Copr. Data Courier Inc.)
        Set Items Description
        --- ----- -----------

? S MICROCOMPUTERS/DE
          1  2016 MICROCOMPUTERS/DE

? S ACCOUNTING/DE
          2  6506 ACCOUNTING/DE

? C 1AND2
          3    42 1AND2
```

Screen 2: After you combine the "microcomputer" search in Screen 1 with a search for "accounting" and then use the AND operator, Dialog responds with a listing of 42 records that cover both subject areas.

tants, accountancy, or *CPAs.* You could select each of these terms and connect them with OR to create a larger set of records that contain any of the terms. A record containing more than one of the terms will be counted only once. Including these alternate terms in the search strategy retrieved 11 additional items, bringing the total to 53 (see Screen 4).

The function of each operator is illustrated by the use of the Venn diagrams in Figure 1. Each circle represents a search term, and the shaded areas represent the results of combining the terms with a given operator.

Choosing Search Terms

Once you select the data bases that you need, you must develop a search strategy. To begin this process, ask yourself: What exactly is my question? What words can be used to express its key concepts?

The first decision you must make is how narrowly to focus your question. There is a trade-off in searching between high recall (finding lots of information) and high precision (finding relevant information). The more specific your terminology, the higher the precision will be. The more general your terminology, the higher the recall will be. If your terms are too general, you'll retrieve too many references, many of which will probably be irrelevant. For instance, if you want to read about solar heating for swimming pools, don't try to search a category as broad as *solar energy;* look for *solar heating* instead. If you're interested in direct mail marketing, avoid the general term *marketing* alone—it's too broad. Instead, combine it with *direct mail.* Avoid searching big concepts of which your topic is one small part.

On the other hand, if your terms are too specific, you won't get enough information and you may miss items of potential interest. Say you want to find market data on potato chips and pizza: don't limit your search terms to *potato chips* and *pizza*—try searching the broader terms *snack foods*

```
File15:ABI/INFORM - 71-83/Dec
(Copr. Data Courier Inc.)
        Set Items Description
        --- ----- -----------

? S MICROCOMPUTERS/DE
          1  2016 MICROCOMPUTERS/DE

? S ACCOUNTING/DE
          2  6506 ACCOUNTING/DE

? C 1AND2
          3    42  1AND2

? S SOFTWARE/DE
          4  4498 SOFTWARE/DE

? C 3NOT4
          5     28 3NOT4
```

Screen 3: To exclude "software" from the search you can use the NOT operator. Here, NOT reduces the list from 42 articles to 28.

```
File15:ABI/INFORM - 71-83/Dec
(Copr. Data Courier Inc.)
        Set Items Description
        --- ----- -----------

? S MICROCOMPUTERS/DE
          1  2016 MICROCOMPUTERS/DE

? S ACCOUNTING/DE
          2  6506 ACCOUNTING/DE

? S ACCOUNTANTS/DE
          3  1393 ACCOUNTANTS/DE

? S ACCOUNTANCY/DE
          4    54 ACCOUNTANCY/DE

? S CPAS/DE
          5   604 CPAS/DE

? C 2OR3OR4OR5
          6  7666  2OR3OR4OR5

? C 1AND6
          7    53  1AND6
```

Screen 4: To expand the search you can use the OR operator to bring in articles tagged with other descriptors that pertain to accounting. The same method could be used with "microcomputers" to bring in the terms "PC" and "personal computers."

and *fast foods* as well. Records using those phrases are likely to contain data on potato chips and pizza along with other foods.

Synonyms, Truncation, and Other Variations

Most words or ideas have synonyms, which you must anticipate when you're formulating a search strategy. A search on genetic engineering, for instance, should also include the synonymous terms *bioengineering*, *biotechnology*, and *recombinant DNA*, among others. A search in the National Newspaper Index using all these terms retrieved 135 more references than *genetic engineering* alone would have provided.

You must also consider variations in the form of a search term. You can allow for plurals and other variant endings by truncating your search terms. Truncation means asking the computer to search for all words beginning with the string of letters preceding the truncation symbol. Each system has its own symbol for word truncation. It might be a colon (:), a dollar sign ($), or a pound sign (#). In Dialog, it is a question mark (?). Typing **pollut?** would tell the computer to look for *pollute*, *pollution*, *polluting*, and so forth.

Use the truncation feature with care. If you try to search both the singular and plural of *car* by typing **car?**, you'll also get *care*, *cart*, *card*, and *carp*, along with many other words beginning with *car*. Most systems allow you to specify the number of additional letters after the truncation symbol.

You should also remember to include variations in spelling (such as the British *colour* and *flavour*), word segmentation (*antifreeze* and *anti-freeze*), or abbreviations (*EFT* for electronic funds transfer or *HPLC* for high-performance liquid chromatography). You might even encounter combinations of these variations, such as *videodisc*, *videodisk*, *video-disc*, and *video-disk*. In each case, a complete retrieval in a data base search depends on using all the variations. The number of hits (occurrences) resulting when the variations are combined with OR is usually larger than the numbers for the individual terms.

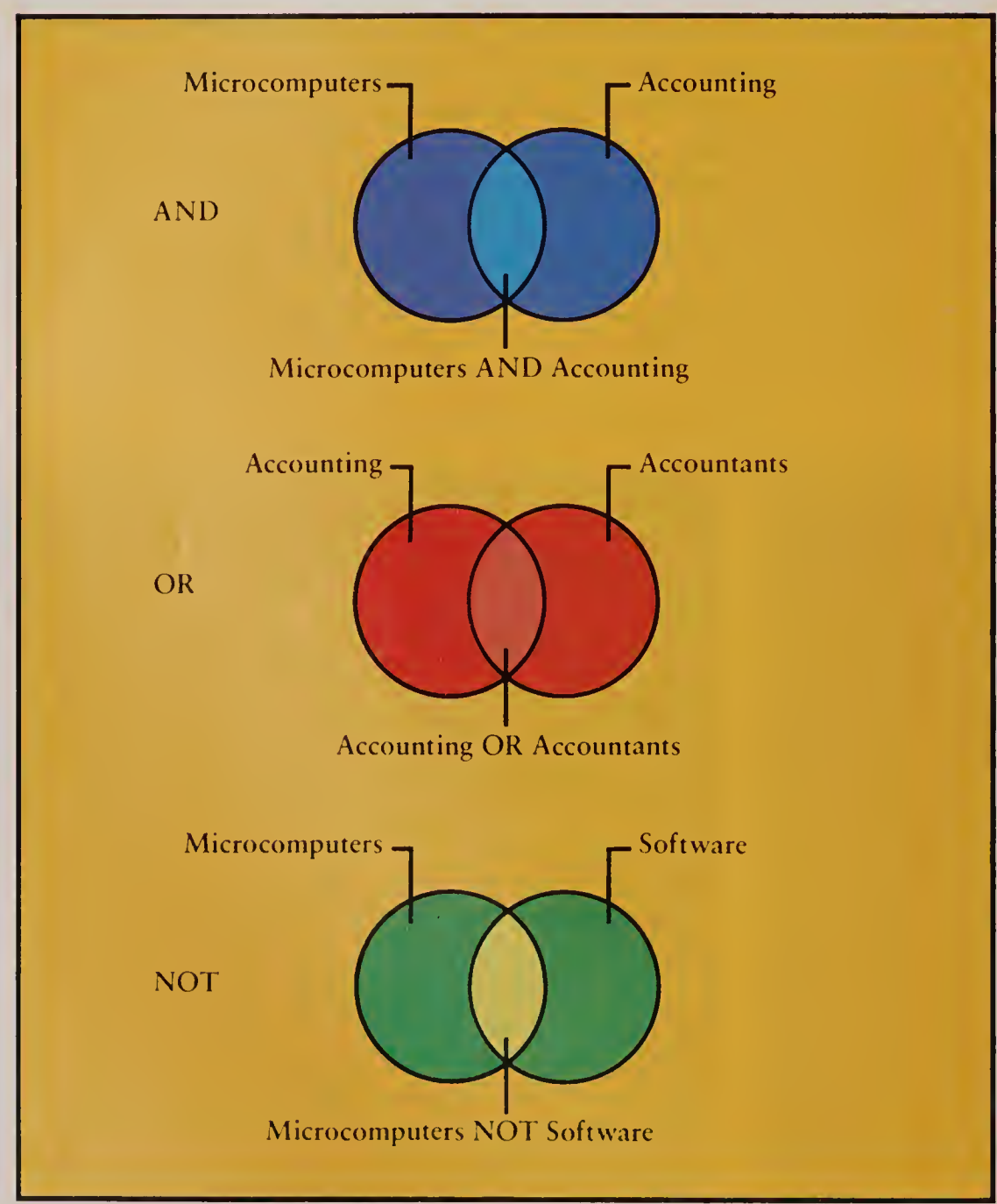


Figure 1: Venn diagrams illustrate the results of using Boolean operators. The AND and NOT operators usually narrow a search; the OR operator expands it.

Expanding

A good way to find search terms is to use a special technique that allows you to display words from the data base in an alphabetical array. Depending on which system you're in, this is known as expanding, rooting, or neighboring a term. When the system receives the appropriate command, it will display a group of words in the data base that fall on either side of your term. You can see all the words close to your term, with their variant forms and spellings, and you can select words directly from this display to be search terms in your strategy. This process is similar to that of a spelling checker that provides alternate spellings.

```
File 150:Legal Resource Index - 80-84/May
          Set Items Description
          --- ----- -----------

? expand bankrupt
Ref Items  Index-term
E1      1  BANKRUPCY
E2      1  BANKRUPRCY
E3     40 *BANKRUPT
E4     20  BANKRUPTCIES
E5   1536  BANKRUPTCY
E6      1  BANKRUPTCY ACT. 1975.
E7      1  BANKRUPTCY AND
             REORGANIZATION.
E8      1  BANKRUPTCY CODE
E9    198  BANKRUPTCY COURTS
E10     1  BANKRUPTCY FORMS AND
             PRACTICE.
                                -more-

? p
Ref Items  Index-Term
E11     1  BANKRUPTCY LAW SECTION.
E12     1  BANKRUPTCY LAWYERS BAR
             ASSOCIATION
E13     1  BANKRUPTCY REFORM ACT
E14     1  BANKRUPTCY REFORM ACT
             OF 1978
E15     1  BANKRUPTCY.
E16     2  BANKRUPTING
E17     5  BANKRUPTS
E18     3  BANKRUTPCY
E19     2  BANKRUTPCY COURTS
E20  1027  BANKS
                                -more-

? se1-e19

           1  1548 E1-E19
                   E3: BANKRUPT
```

Screen 5: The Expand command displays an alphabetical array around your search term so you can bring in articles that contain misspellings and other variations.

In the example in Screen 5, the Expand command has been used in the Legal Resource Index to find terms for a search on bankruptcy. The terms labeled E1 through E19 have been selected in an OR relationship to make up set 1.

Notice items E1, E2, E18, and E19, which are typographical errors in the data base. Without expanding on the desired term *bankruptcy*, you would never have known these items existed. Data bases frequently contain misspellings that can be detected and then retrieved using the Expand command.

Controlled Vocabulary

When you go to a library to do research, you probably have a topic in mind to look up in the subject card catalog. Let's say you're planning to build a house and want to look at books about houses to get some preliminary design ideas. You flip through the subject catalog and find not a single card listed under *houses*. When you ask for help, the librarian consults a large volume called *The Library of Congress List of Subject Headings* and finds that books about houses are cataloged under *domestic architecture*. The Library of Congress list is a "controlled vocabulary," a guide prepared for book catalogers so that they can use uniform terminology when they categorize books by subject.

The people who index on-line data bases also use controlled vocabularies so they can assign subject headings to material in a uniform, organized manner. These

controlled vocabulary terms are listed in the thesauri published by the data base producers to help you design your search strategies. For example, if you wanted to search the INSPEC data base for articles on computer-aided design, the INSPEC thesaurus would tell you to search under the search term *CAD*.

Controlled vocabulary words are also known as descriptors, since they describe the contents of a record. In most cases, the data base producers have read the item to be indexed and have decided which descriptors best represent the record's content. The advantage of searching with a controlled vocabulary is the elimination of guesswork in terminology. You don't need to worry about the exact language someone may have used in writing about a topic.

Descriptors are particularly important in data bases that don't include abstracts, such as the National Newspaper Index, or in data bases for which only some of the records include abstracts, such as Medline (the data base of the National Library of Medicine). Without an abstract, only the title and the descriptors are available for a subject search. Titles occasionally appear to be unrelated to the contents of an article, so the descriptors then become the only meaningful part of a record to use in a subject search.

```
File15:ABI/INFORM - 71-83/Dec
(Copr. Data Courier Inc.)
        Set Items Description

        --- ----- -----------

? S BANKING
        1    9772 BANKING

? S BANKING/DE
        2    6427 BANKING/DE


? S INCOME
        3   21187 INCOME

? S INCOME/DE
        4    5288 INCOME/DE


? S CONSUMERS
        5    6747 CONSUMERS

? S CONSUMERS/DE
        6     738 CONSUMERS/DE
```

Screen 6: Most on-line services provide the option of searching the entire basic index, including the abstract (free text), or searching the assigned descriptors only (controlled vocabulary). Searching with controlled vocabulary (/DE in Dialog) nearly always yields a smaller number of records.

Free Text Searching

The alternative to using a controlled vocabulary is free text searching, which simply means using any words or groups of words as search terms. This approach is effective when you are looking for an unusual subject, when your subject can be accurately described with unique terminology that is unlikely to appear out of context, or when you want to retrieve every mention of a particular word or phrase from a data base.

A record in an on-line data base is made up of many parts, including author, title, journal name, publication year, abstract, and descriptors. Certain parts of the record make up the *basic index*,' usually those parts that are relevant to the record's subject content: title, abstract, descriptors, and identifiers. (Identifiers are significant keywords extracted from a publication. They do not correspond to any controlled vocabulary, and they supplement the descriptors.)

In setting up your search strategy, you have the choice of using free text to retrieve any mention of a word anywhere in the basic index, or controlled vocabulary to search the subject descriptors only. If you have a thesaurus of descriptors for a data base, you can start your search with the controlled vocabulary. If you have no thesaurus and plan to search free text, decide whether you want to

search the entire basic index or restrict your search to just certain parts of it.

Looking for a word in the title is a good way to begin a well-focused search, especially if your topic is broad or uses common words that may appear out of context. A special suffix is required to search a word in a particular part of the basic index. To select a word in the descriptor section in Dialog, you add the suffix */DE*. In ORBIT you add */IW;* and in BRS, *.DE*.

Other suffixes restrict your search to other parts of the basic index. You can stack the suffixes if you want to search more than one part at a time. For example, entering **bicycles/DE,TI,ID** in Dialog initiates a search for the word *bicycles* in the descriptor, title, and identifier fields but not in the abstracts. This technique is useful for eliminating those items that mention bicycles somewhere in the abstract but are not primarily about bicycles.

In Screen 6, the broad search terms Banking, Income, and Consumers were entered as free text in the Dialog basic index and then as descriptors only. As you can see, the numbers of occurrences differ significantly.

In some systems, all fields (parts of a record) are identified with suffixes. You can select a term in any field just by adding the appropriate suffix to the term. In BRS, for example, the field (or paragraph, as BRS calls it) for publication source is labeled *SO*. To search for information from a particular journal, you enter a keyword from the journal title followed by a period, the suffix, and another period—for example, **LANCET.SO.**. In Dialog, however, if you want to search any part of a record not in the basic index, special prefixes are required.

Thinking and Typing

Despite training, reading your documentation, and carefully preparing your strategy before going on line, you may find that the actual experience of searching a data base is unnerving. On-line searching requires the ability to concentrate fully, to think quickly and creatively, to type accurately while both concentrating and thinking, and to plan ahead while you concentrate, think, and type. All the while you're aware that every second on line is costing you money. The only way you can ever feel comfortable with this process is to do it—often.

Barbara Newlin is currently involved in the design and development of data base access software products at Menlo Corporation in Santa Clara, California.

Reprinted from Answers Online: Your Guide to Informational Data Bases *by Barbara Newlin. Copyright © 1985 by McGraw-Hill, Inc. Used with the permission of Osborne/McGraw-Hill.*

SOMEBODY

Has To Have The Lowest Prices

IBM PC, 256 K, One Half Height 320 K Disk Drive DS/DD, Persyst Color Card, Taxan Green Monitor, DOS 2.1 PLUS a 10MB Hard Disk Sub System all for **$2690.00**

IBM PC, 256 K, Two Half Height Drives DS/DD, Persyst Color Card, Taxan Green Monitor, DOS 2.1, 130 Watt Power Suply PLUS a 10MB Hard Disk Sub System all for **$2980.00**

IBM PC, 256 K, Two Half Height Drives DS/DD, Persyst Color Card, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply, 10MB Hard Disk Sub System, PLUS 10MB Tape Back Up System all for **$3579.00**

IBM PC, 256 K, Two Half Height Drives DS/DD, Persyst Color Card, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply, 20MB Hard Disk Sub System all for **$3380.00**

IBM PC, 256 K, Two Half Height Drives DS/DD, Persyst Color Card, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply, 20MB Hard Disk Sub System PLUS 10MB Tape Back Up System all for: **$3979.00**

(We configure and test the system at no extra cost.)

MONITORS

AMDEK 300	$135.00
PGS HX-12	$475.00
PGS MAX-12	$190.00
PGS SR-12	$625.00
TAXAN GREEN COMPOSITE	$125.00
TAXAN AMBER COMPOSITE	$135.00
TAXAN GREEN W/TTL PLUS	$149.00
TAXAN AMBER W/TTL PLUS	$159.00
IBM MONOCHROME DISPLAY	$260.00
IBM COLOR DISPLAY	$590.00

PRINTERS

EPSON FX 80	$425.00
EPSON FX 100	$625.00
EPSON RX 80	$245.00
EPSON RX 80FT	$295.00
OKIDATA 82A	$299.00
OKIDATA 83A	$569.00
OKIDATA 92P	$399.00
OKIDATA 93P	$625.00
OKIDATA 84P	$759.00
OIKIDATA 2410P	$1959.00
TOSHIBA P1351	$1295.00
NEC SPINWRITER 3550	$1595.00
NEC PINWRITER 80 COL	$699.00
NEC PINWRITER 136 COL	$899.00
BROTHER HR-25	$699.00
BROTHER HR-35	$925.00

(Accessories on NEC & OKIDATA printers available)

DRIVES

TANDON TM-100-2	$179.00
SLIMLINE - TOSHIBA	$155.00
SLIMLINE - TEAC 55B	$155.00

MULTIFUNCTION BOARDS

AST I/O+1 SER & 1 PAR	$179.00
AST SIX PACK 64K, 1 SER & 1 PAR	$269.00
QUADBOARD 64K	$269.00
IBM COLOR GRAPHIC ADAPTER	$225.00
IBM MONO PRINTER ADAPTER	$230.00
PERSYST COLOR ADAPTER	$190.00
PERSYST MONO PRINTER ADAPTER	$210.00
HERCULES GRAPHIC ADAPTER	$349.00
HERCULES COLOR CARD	$210.00
STB GRAPHIX PLUS II	$375.00

MODEMS

HAYES SMART MODEM 1200	$469.00
HAYES SMART MODEM 300	$209.00
HAYES 1200B PLUG IN CARD	$429.00
QUBIE PC 212A/1200 INT	$275.00
QUBIE PC 212E/1200 EXT	$299.00

HARD DISKS

10MB SUB SYSTEM INT	$850.00
10MB SUB SYSTEM EXT	$1025.00
10MB TAPE BACK UP	$599.00

GENERAL

CONTROL DATA DISKETTES	$25.00/box
KEYTRONIC KB5151	$189.00
PARALLEL CABLES	$25.00
64K RAM UPGRADE KIT	$50.00
128K RAM UPGRADE KIT (For AT)	$199.00
IBM PC POWER SUPPLY (Original) 63.5 Watts	$89.00
IBM KEYBOARD FOR PC (Original)	$109.00

Circle 116 on reader service card

Microshop COMPUTER PRODUCTS

(714) 838-7530

2640 Walnut Avenue, Unit K,
Tustin, California 92680

(Prices & availability subject to change without notice — IBM is a registered trademark of IBM Corporation.)

make Stat magic

Now for the IBM PC/AT* with hard disk

Statistics, reports and plots happen magically with SPSS/PC™—*the* Statistical Package for IBM PC/XTs.*

SPSS/PC is the most comprehensive statistical package for performing simple or complex tasks, regardless of data size. It maintains feature and language compatibility with mainframe SPSS, while optimizing for the PC environment.

Statistics range from simple descriptive to complex multivariate, including Multiple Regression, ANOVA, Factor and Cluster analysis. Loglinear and nonparametric procedures are also included.

Simple facilities allow transfer of files between SPSS/PC and programs like Lotus 1-2-3, dBase II and SAS. A complete Report Writer, Plotting facilities and a Communications program for mainframes round out a fully integrated product.

For more information, contact our Marketing Department without further ado. And see what a little stat magic can do for you.

SPSS Inc., 444 N. Michigan Avenue, Chicago, IL 60611, 312/329-3500.

In Europe: SPSS Benelux B.V., P.O. Box 115, 4200 AC Gorinchem, The Netherlands, Phone: +31183036711 TWX: 21019.

VISA, MasterCard and American Express accepted.

SPSS inc. PRODUCTIVITY RAISED TO THE HIGHEST POWER™

*SPSS/PC runs on the IBM PC/XT or AT with 320K memory and a hard disk. An 8087 co-processor is recommended. Contact SPSS Inc. for other compatible computers.

IBM PC/XT and AT are trademarks of International Business Machines Corporation. dBase II is a trademark of Ashton-Tate. 1-2-3 is a trademark of Lotus Development Corporation. SAS is a registered trademark of SAS Institute, Inc. SPSS and SPSS/PC are trademarks of SPSS Inc. for its proprietary computer software. © Copyright 1985, SPSS Inc.

Circle 844 on reader service card

HOW TO KEEP YOUR PC FROM BECOMING OLD HAT.

THE EXTEND SERIES.™
PC expansion products
or today. And tomorrow.

You bought your IBM or com-
tible PC for all the right reasons.
fter all, it was IBM who esta-
shed a much-needed standard
serious business software.

But in the computer industry,
e only constant is change. And
th change comes the very real
ncern that your PC investment
ay not stay up to date.

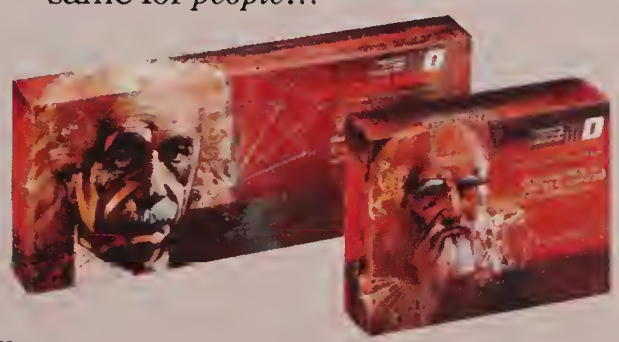
Then, there are your chang-
g business needs to consider.
ill they include memory-hungry
tegrated software packages?
raphics? Communications?

M is a Registered Trademark of International Business Machines.

Circle 829 on reader service card

Not to worry. The EXTEND SERIES™ line of expansion products can update the performance of your IBM or compatible PC, and give it whatever new capabilities you need, in the most cost-effective way. Today, and in the years ahead.

Now, if we could just do the same for *people*...



Please send me a brochure on The Extend Series, PC Expansion Products, and a list of dealers.

Name

Company

Address

City State Zip

THE EXTEND SERIES™
PC Expansion Products

10273 Yellow Circle Drive
Minnetonka, Minnesota 55343 (612) 935-9111.

DIGIGRAPHIC SYSTEMS CORPORATION

Just over a year ago, SofTrak Systems introduced MicroTrak scheduling software, and wrote the first chapter of a classic microcomputer industry success story. Now SofTrak has written a whole new plot for the MicroTrak story.

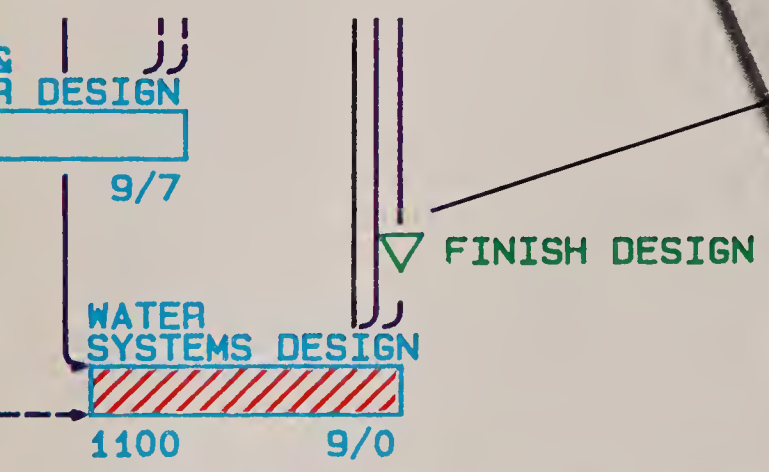
Announcing PlotTrak.

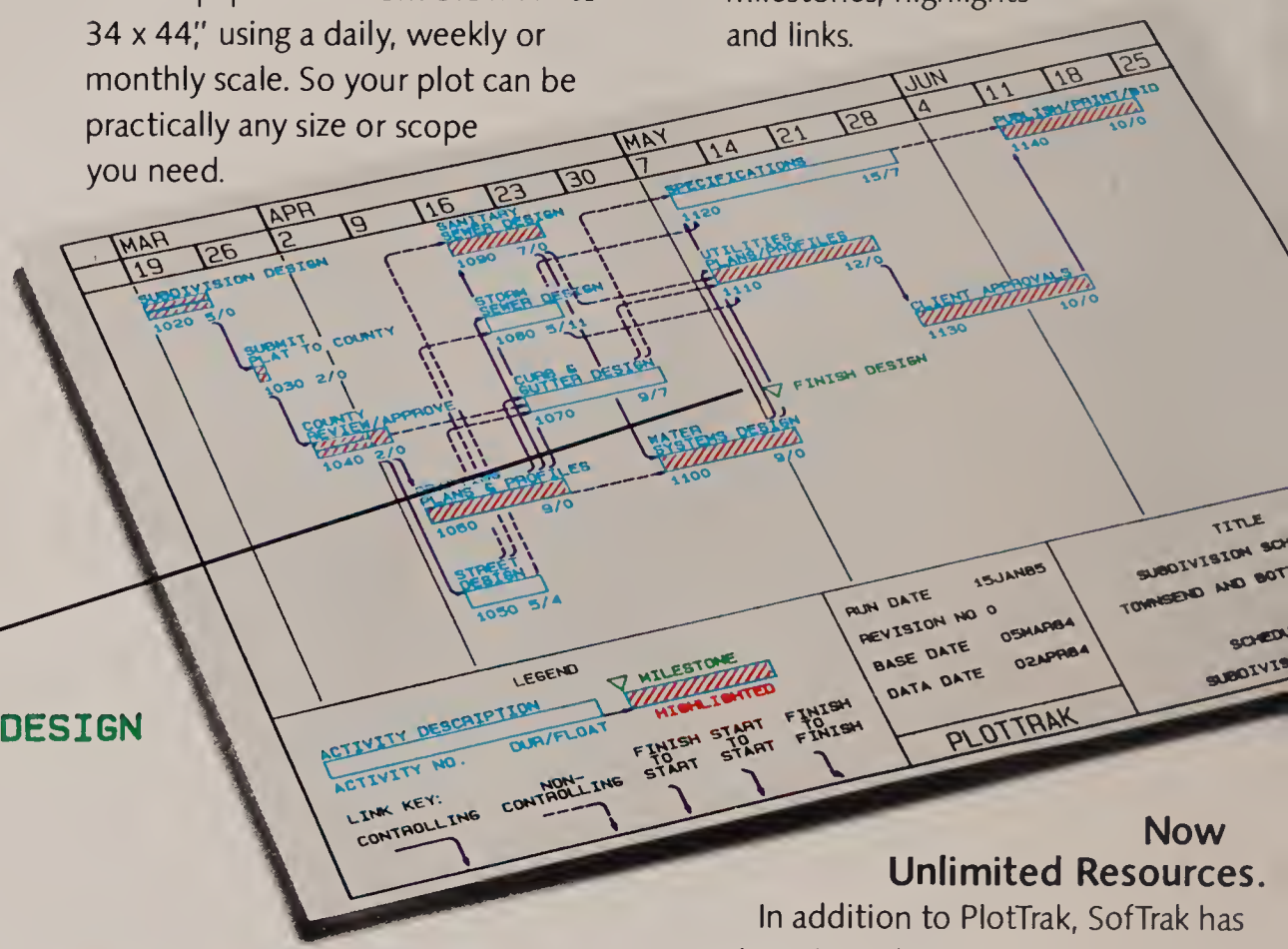
PlotTrak is the new plotter software from SofTrak. Using MicroTrak files, PlotTrak generates a colorful, easy-to-read schedule with many helpful features.

Activity Selection. With PlotTrak, any subset of activities in the overall schedule can be selected for plotting. Plus you can plot items before or after a given date, or items between two dates.

Plot Dimensions. PlotTrak lets you choose paper sizes from 8½ x 11" to 34 x 44," using a daily, weekly or monthly scale. So your plot can be practically any size or scope you need.

Activity Highlighting. Any part of your MicroTrak schedule can be highlighted with PlotTrak. And different pen colors can be used to emphasize specific activities, milestones, highlights and links.





SOFTRAK INTRODUCES AN EXCITING NEW PLOT FOR MICROTRAK.

Now Unlimited Resources.

In addition to PlotTrak, SofTrak has also released a new, upgraded version of MicroTrak featuring unlimited resources. Now MicroTrak can utilize any number of resources for inclusion in your schedule.

Continuing Innovation.

The introduction of PlotTrak and unlimited resources for MicroTrak begins a new chapter for SofTrak Systems. With continued innovation, SofTrak is setting a standard for MS-DOS* and Unix*-based project management software.

FREE 2-WEEK TRIAL.

We want you to give PlotTrak (and MicroTrak, if you're not already using it) the acid test. So we'll send you a diskette and give you two weeks to try it out. We think you'll like it. But if not you can send it back with no obligation. Interested? Call us today:

1-801-531-8550

SOFTRAK

SofTrak Systems, 1977 West North Temple
Salt Lake City, Utah 84122

Circle 811 on reader service card

*MS DOS is a registered trademark of Microsoft Corporation *UNIX is a trademark of AT&T Bell Laboratories

THE KEY TO PC PRODUCTIVITY.

THE PC SUPERTOOL.

It unlocks the mainframe power in your PC.

Are you still building systems using primitive database technology? Now there's a supertool that can give you productivity gains of **10 to 1** or more: PC/FOCUS.

PC/FOCUS builds your applications with simple, plain-English commands. It actually lets you design and develop systems **TEN** times quicker!

Plus, along with building systems **faster,** PC/FOCUS helps you build them **better!** As a complete information management system, it integrates a relational database, screen manager, report writers, graphics, financial modeling and statistical analysis...quickly, simply and easily.

It even lets you design systems that download data extracted from mainframe files and DB's, then upload data and procedures from the PC back to the mainframe for production execution.

In fact, PC/FOCUS does so much, you may not be able to find anything it can't do!

PC/FOCUS. The fourth generation supertool that unlocks the mainframe buried in your PC. For details, fill out and mail the coupon or write to: **Don Wszolek, Dept. U7, Information Builders, Inc., 1250 Broadway, New York, NY 10001.**

Dear Don;
Yes! I'd like to learn more about **PC/FOCUS,** the supertool that can unlock the mainframe power in my PC. Mail full details to:

NAME_____

_____ TITLE_____

COMPANY_____

_____

ADDRESS_____

_____

CITY_____

STATE_____ ZIP_____

TELEPHONE_____

_____

INFORMATION BUILDERS, INC.

New York: (212) 736-4433 • Washington, D.C.: (703) 276-9006 • St. Louis: (314) 434-7500 • Chicago: (312) 789-0515
Dallas: (214) 659-9890 • Palo Alto: (415) 324-9014 • Los Angeles: (213) 615-0735 • Houston: (713) 952-0260

Dealer Inquiries Invited.

Circle 83 on reader service card

MY PRESENTATION IS IN FIVE MINUTES. I'VE JUST DISCOVERED I NEED A GRAPH.

HERE'S HOW:
FRAMEWORK SOFTWARE

You've been up all night on your PC shuffling disks to create a proposal for a major new account. With four separate programs, you've made your work convincing with spreadsheets, data management and graphics sprinkled throughout. Now, the chance of a lifetime—and your future with the company—is just five minutes away. A successful presentation will tie it all up.

That's when you discover you've left out a graph that's critical to the presentation.

That's also when you discover how much you need Framework.™

The integrated capabilities of Framework would enable you to quickly scan an outline of your presentation and bring up the spreadsheet or database containing the numbers you want to graph. The rest is easy.

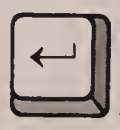
Press the F6 key. You'll select the numbers you need to graph.

Use the 4 arrow keys to highlight the numbers you want.

Press the Return key. This confirms the selection.

Press both the Ctrl and G keys at the same time. This opens the graph menu. The Bar Graph option is already selected. That's the one you needed.

Press the Return key. This confirms the selection.



Press the Return key again. The graph appears in a new frame that Framework automatically creates for you. There's your new graph, created in a matter of seconds. To print it out:

Press the Ctrl and P keys at the same time. This selects the Print option.

Press the Return key. Then sit back and watch the magic.

Framework would have given you the time to pour a cup of coffee, straighten your tie and save your career with the graph.

For a dealer near you call (800) 437-4329, ext. 225. In Colorado (303) 799-4900, ext. 225.

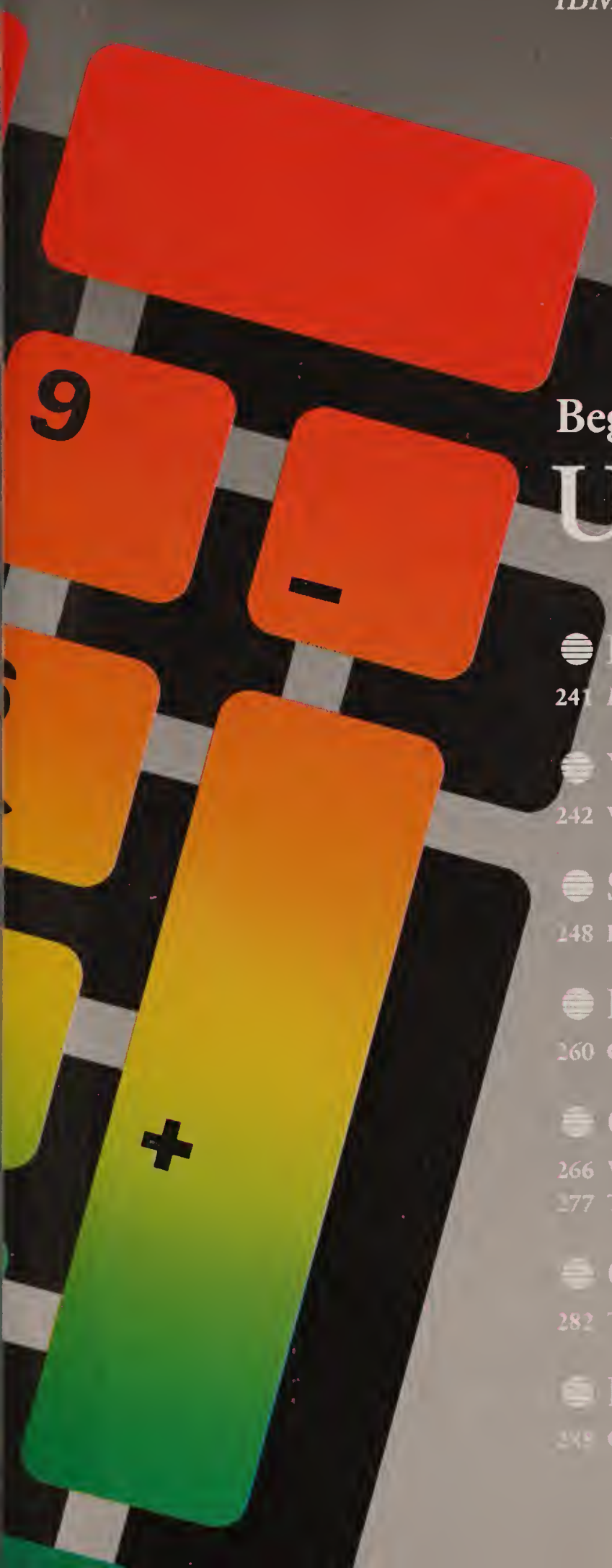
Framework and Ashton-Tate are trademarks of Ashton-Tate.
©Ashton-Tate 1985. All rights reserved.

Software from
ASHTON·TATE™
We'll put you in control.

Circle 867 on reader service card

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles



Beginner's Guide:
Up and Running!

Introduction
241 *Harry Miller*

Word Processing
242 Word Processing Tips, *Terry Tinsley Datz*

Spreadsheets
248 Introduction to Spreadsheets, *Harry Miller*

Data Base Management
260 Getting to First Base, *David Frankel and Michael Gartman*

Communications
266 What Makes Modems Run? *Larry Jordan*
277 The Communicators, *Larry Jordan*

Graphics
282 The Boom in Business Graphics, *David L. Wilcox*

Programming
288 Cooking Up a Batch File, *Darry Arnold and Seth Morrowsky*

Networking Raised to a Greater Power

Advanced Technology. With it, IBM tripled the speed of the PC and increased its memory capacity five-fold. Nowhere is this increase in computing power more important than in networking situations. If the AT's technological advances have prompted you to look into a multi-user network, you owe it to yourself to take a closer look at MultiLink Advanced™ . . . a unique multi-tasking, multi-user networking system that runs programs under PC-DOS 3.0.

Eight Workstations for the Price of an AT. MultiLink Advanced™ represents the next generation in networking systems for IBM microcomputers. The system enables terminals, connected to a single AT, to emulate IBM-PC's having up to 480K of RAM (The PC-Shadow™ terminal, shown above, even has a PC look-alike, as well as work-alike, keyboard and display).

This means that instead of spending $3,000 per workstation for a PC with a Kilobuck "Network Interface Board," you can use inexpensive terminals . . . eight of which cost less than an IBM AT. Even if you need only one workstation connected to your AT, you'll realize significant savings.

MultiLink Advanced™ . . . Instant Access to All of Your Resources. Central to most multi-user situations is the need to coordinate a variety of printers. With what's been described by *PC-Tech Journal* as ". . . by far, the best print spooler for the IBM PC," MultiLink Advanced™ gives users the option to print either at their workstations, or at a central location. In addition, programs and files can be shared by multiple users locally or through use of a modem. Just think of it . . . having remote access to an AT with a lightweight terminal/modem.

Although designed to take advantage of the AT, MultiLink Advanced™ runs on all versions of PC-DOS, except 1.0, and certain implementations of MS-DOS. A wide range of leading programs are supported which include WordStar, dBASE III, Multimate, and Lotus 1-2-3.

Get the Advanced Story Today. Call The Software Link Today for complete details and the dealer nearest you. MultiLink Advanced™ is immediately available at the suggested retail price of $495 and comes with a money-back guarantee. VISA, MC, AMEX accepted.

MultiLink™ ADVANCED

THE SOFTWARE LINK, INC.

8601 Dunwoody Place, Suite 336, Atlanta, GA 30338 Telex 4996147 SWLINK

CALL: 404/998-0700

Dealer Inquiries Invited

MultiLink Advanced™ is a trademark of The Software Link, Inc.

Circle 526 on reader service card

See us at Booth #B218
COMDEX/Spring '85
May 6-9, 1985
Georgia World Congress Center,
Atlanta, Georgia

IBM, PC, AT, & PC-DOS are trademarks of IBM Corp. MS-DOS, WordStar, dBASE III, Lotus 1-2-3, and Multimate are trademarks of Microsoft Corp., MicroPro, Ashton-Tate, Lotus Development Corp., & Multimate International, respectively

Harry Miller

The Best of the Basics

PC World gets back to basics with a look at our best articles for beginners.

Computers and software are becoming more attractive and accessible, but getting started with a personal computer is still not easy. This special section, *Up and Running: PC World's Official Beginner's Guide*, is designed to make getting started a little easier. It brings together some of our best entry-level articles. Each article aims to get you better acquainted with an application that gets the work done on the PC. Most of this material has appeared in previous issues of *PC World*. When necessary, the articles have been revised and updated.

This special section addresses the problem of getting started in the same way that any beginner might: first, it explores word processing, then spreadsheets, then data management, communications, graphics, and finally programming.

As you become accustomed to word processing, you'll discover the freedom to write the conclusion before the introduction—if that's how your inspiration flows. When you make forecasts and projections on an electronic spreadsheet, you'll experience the satisfaction of exploring a wider range of alternatives and seeing the results instantly.

Using data management software, you'll gain control of the data that passes through your business life and be able to organize those shoeboxes full of invoices and purchase orders you've been avoiding for so long. Once you learn to transform that box of chips and wires on your desk into a medium for communication, you'll open up a whole new world of on-line data bases, electronic mail, and electronic bulletin boards.

About graphics, they say a picture's worth a thousand words (in computer terms that's about an 8 to 10K file). But in a business situation, when a picture gets an important point across, it's also worth its weight in gold.

Finally, programming can provide useful direct access to the computer's resources and power and in the process be a challenging and rewarding logical puzzle.

Whether this package represents an exploration or a refresher course, we hope it will be a helpful reference in getting "Up and Running."

Word Processing Tips

Whether your word processor is a top-of-the-line powerhouse or a basic economy model, memorizing its commands is just the first step toward tapping your program's potential. Here's an informal guide for getting more out of your word processor.

Terry Tinsley Datz

As most personal computer users can attest, experience is a harsh teacher. Almost every new user has accidently formatted an important data disk or issued a command that produced unanticipated anguish. Though trial and error teaches many lessons a user manual doesn't, there is a less painful way to acquire the fruits of experience. What follows is a compendium of tips, tricks, and surefire work routines that can get you up and running with your word processing program—and help you avoid some of the pitfalls.

Writing Without Tears

By eliminating most of the physical obstacles to writing and rewriting, word processors smooth the path that ideas must travel between conception and the printed page. But ironically, word processors can create psychological roadblocks. Does facing a blank screen numb your mind? Does a flashing cursor trigger panic instead of inspiration? Don't despair; you're not alone. In a recent *New York Times* interview, novelist John Updike admitted, "When I turn on the word processor, I feel I'm wasting electricity; with the pencil, I'm only wasting my own time."

Whether you are writing a novel or a business report, one way to sidestep these mental barriers is by typing whatever ideas, phrases, or sentences pop into your head. This "freewriting" approach is tailor-made for the word processor: you don't have to feed your computer fresh sheets of paper or endure the thudding rat-a-tat-tat of a typewriter. Chances are one idea will lead to another, and the theme or approach you've been searching for will begin to emerge. No matter how disorganized your thoughts are, they can always be sifted and reordered later.

Write now, edit later. Once you've struggled through the first few paragraphs, resist the temptation to stop and edit them. As you pause to collect your thoughts, it's natural to look over what has been written and decide that it needs reworking. Avoid

falling into this trap or you may never get past the first page. One way to prevent premature tinkering is to scroll existing text off the screen, out of sight; by eliminating this distraction you can concentrate on the writing at hand.

Editing

Use the insert mode. Most word processors offer two typing modes: insert mode, in which new typing pushes existing text to the right, and overtype mode, in which anything in the path of the cursor is replaced. Although overtype mode is handy for correcting typographical errors, if you forget to switch back to the insert mode you may inadvertently write over valuable text. It's safer to correct mistakes in the insert mode, by first entering the correction and then erasing the error. For fast typists, it is easier still to delete the entire word and reenter it.

When in doubt, don't delete. Reconsider before erasing hard-earned writing, particularly when a large block of text is involved. Instead of deleting the text, move it to the end of the file or to a separate scrap file for safekeeping. Even if your word processor has a Restore or an Undo command, remember that only the most recent deletion can be rescued.

Copy versus cut and paste. Some word processors move blocks of text in a "cut-and-paste" fashion. A block is marked, removed from the document, and placed in a special section of computer memory called a buffer. Once the block's new location is specified, the program fetches the text from the buffer and puts it back into the document. Unfortunately, if you get sidetracked in the middle of the cut-and-paste process and delete something else before the first block is recalled from the buffer, the block may be purged to make room for the more recent deletion. Not every word processor manages block moves in this manner, but you can avoid the problem altogether by copying a block of text, moving the copy to the desired location, and then deleting the original text.

Search and replace. If your word processor doesn't have a command that moves the cursor to a specific page or marker, it probably has a search and replace function that can be used to jump to strategic points in a document. Simply plant a seldom used symbol, such as ~, &, or @, in a passage that you expect to revise. When you initiate a search for the symbol, the program locates it and displays the text you need to edit. Don't forget to search for and remove the symbol before printing the final version of the document.

The search and replace feature can be used to insert awkward or lengthy phrases that will appear frequently in a document. For example, if you constantly needed to refer to the @ pmt($inarea1, (($inarea2/100)112),($inarea3*12))~ macro in a re-

port, you could save time by typing an asterisk in place of the phrase every time it was called for. Once the document was finished, you would direct the program to search for and replace every asterisk with this finger-bending phrase.

Automatically replacing a word or phrase throughout a document is a great time saver, but it can be risky. Computers operate in a literal manner, and a global search and replace may yield unexpected results. For example, if the program cannot differentiate between whole and partial words, changing all occurrences of *man* to *person* will also change *manipulate* to *personipulate.* A slower but safer approach is to confirm each replacement of a word within a document. This one-at-a-time setting is common to most search and replace functions.

Working With Windows

Many new word processors can divide a screen display into several partitions, or windows (see Figure 1). Depending on the program, a window can look into a different file from the one that is currently open or view data in a different part of the same file. Simultaneously viewing data from several sources can be a great convenience and time saver.

For example, updating a report may require referencing company data stored in a separate file. Instead of printing out the latter file, you can split the screen and display the report and the needed data side by side. More important, many programs permit you to move data from one window to another.

However, experience suggests windowing in moderation. While some word processors will partition a display into hundreds of windows, the realistic limit, given the size of most screens, is two or three windows.

Using a Mouse

A mouse allows you to point and click your way through a variety of word processing tasks–choosing menu commands, scrolling through a document, moving and copying blocks of text, and managing windows, to name a few. But a mouse does not always enhance the word processing experience. If the program does not smoothly and elegantly integrate mouse functions, a mouse's usefulness may be limited.

Typing skills are also a factor to consider. If you come from the hunt-and-peck school, a mouse will simplify tasks that require many keystrokes. On the other hand, if you type 90 words per minute on a bad day, a mouse may be superfluous. Chances are your keyboard speed probably falls somewhere in between these extremes, and a mouse may indeed be useful. A mouse is certainly handy with "user-friendly" word processors that make a user wade through a swamp of menus. Opening, moving, and sizing windows or moving blocks of text are other natural tasks for a mouse.

Don't expect pinpoint precision from a mouse unless you have exceptional hand-eye coordination. Until you're an experienced mouser, even highlighting text for block moves can prove frustrating and awkward. Some word processors add to the frustration by creating two cursors–one dedicated to the cursor keys and the other (often in the form of a pointer) to the mouse. When the mouse is not in use, park its pointer at a location outside the text. You'll be able to find it more easily and will be less likely to confuse it with the other cursor.

Formatting and Printing

Save page layouts. A document's layout, or format, is determined by its margins, tabs, page length, spacing, borders, and similar factors. Many word processors permit you to save these settings with commands embedded in the text of the original document. But format settings need not be restricted to a single document. For example, you can create files that hold only format commands. When a new document requires different tab settings–perhaps to accommodate a large table–you need only copy the format commands from an appropriate file.

Programs with limited abilities to save formatting information can benefit from a similar approach. *WordStar,* for example, always boots up with a de-

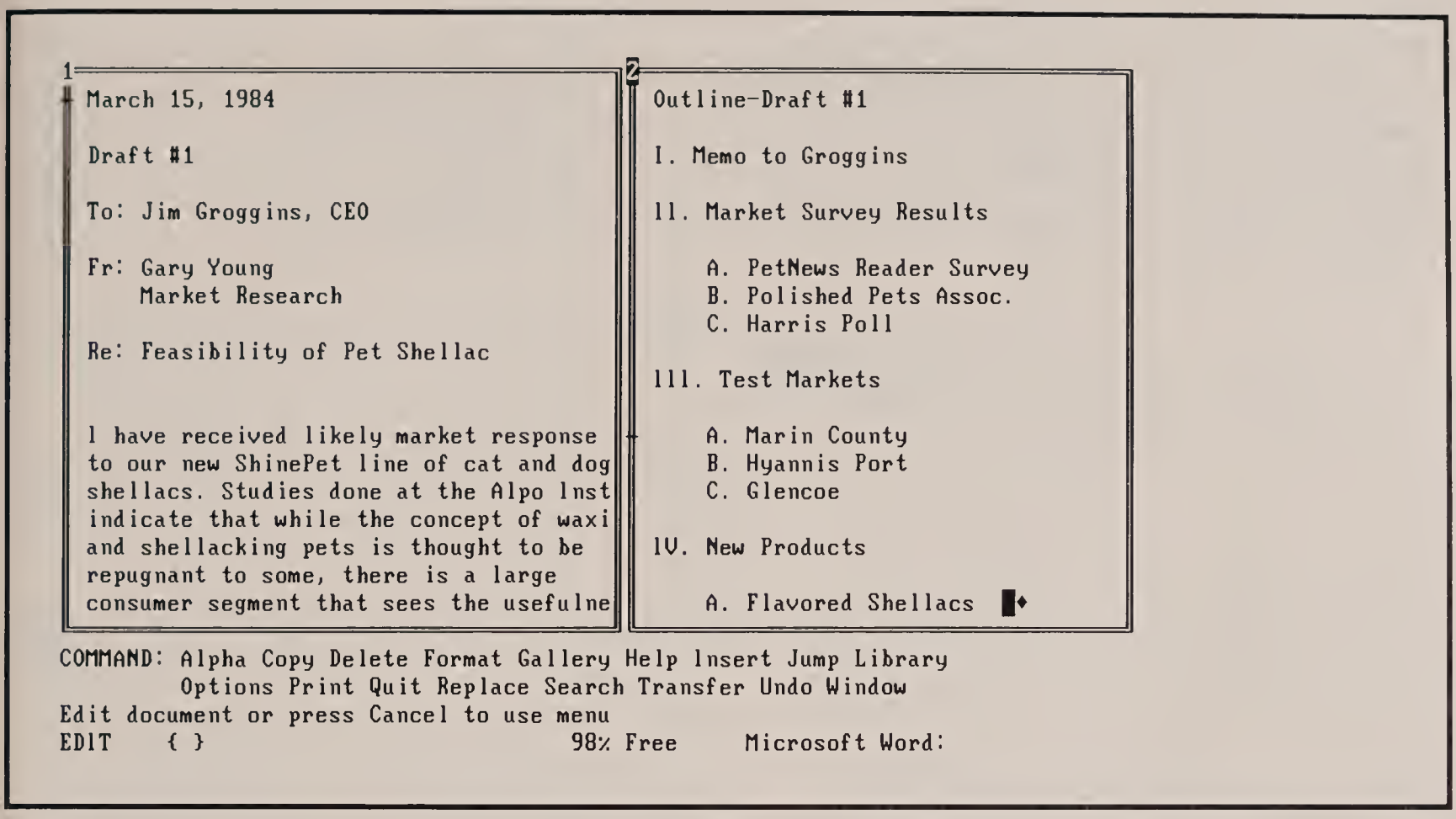


Figure 1: Windows look into other files or different parts of the same file. In this example, a report is written in the left window while the report's outline is simultaneously displayed in the right window.

fault document layout. You can overcome this restriction by typing a ruler line—the margin and tab settings—into a document. If the ruler line is prefaced by . . **< Ctrl > -P < Enter >** , the line will be embedded in the document, but it won't appear when the document is printed out. To activate this line and thus replace the current ruler, press **< Ctrl > -O F**. When the document is saved, any embedded rulers are saved as well.

Use controlled page breaks. Most word processors start printing a new page when the previous page has been advanced a given number of lines by the printer. Naturally, sentences or paragraphs may start on one page and finish on the next. This doesn't usually present a problem, but it can ruin a table or figure that must be viewed in its entirety. If your program offers a conditional paging feature, you can eliminate this problem by placing the necessary commands before the table or figure in question. For example, if you place a conditional command immediately before an eight-line table, the program will start a new page if all eight lines will not fit on the current page. The same technique can prevent headings and subheadings from ending up at the bottom of a page.

Use restraint. Many word processors and printers are capable of special printing effects such as boldface, single and double underlining, and italics. When used judiciously, these special effects can grab the reader's attention; used indiscriminately, however, they may have the opposite effect (see Figure 2).

Handling Files

Smaller is better. The larger a file grows, the slower a word processor works. As you become familiar with a specific program, you will discover how large a file can become before performance is noticeably affected. Typical warning signs are sluggish scrolling and file saves that take an inordinate amount of time. Smaller files also offer the advantage of safety: In the event of human or mechanical failure, there is less to lose.

A little emphasis goes a long way. Handled with *taste* and *good judgment*, it can help direct and inform the reader. However, when someone feels that EVERY word is important and *MUST BE EMPHASIZED*, the printed page starts to look like a battlefield and becomes difficult to read.

Figure 2: "All things in moderation" is a thought to keep in mind when using special print features. Overuse can lead to visual abuse.

Save your work. In one sickening second, a power failure (whether by an act of God or man) can wipe out a day's work. Saving your work at frequent intervals is the best insurance against this catastrophe. The problem, of course, is remembering. Follow a routine and save the file every time you finish a new paragraph or reach the bottom of a page. Better still, set a timer or wristwatch alarm to go off every 15 minutes. It's also a good idea to save a file whenever phone calls, visitors, or other distractions call you away from the keyboard. Last but not least, make it a habit to print out a file at the end of each editing session. A paper backup is better than none.

Saving your work at frequent intervals is the best insurance against a power failure. Follow a routine and make it a habit to print out a file at the end of each editing session.

Check your disks. Before you use any disk, find trouble before it finds you. DOS comes with a simple diagnostic utility called CHKDSK that can tell you how much disk space is available and whether a disk contains bad sectors. Knowing both pieces of information can save you heartaches and hair pulling. If a data disk has 4000 bytes of space remaining, it probably won't pay to begin your next novel on that disk. Some word processors warn you of an impending space shortage and give you a chance to save your file. Others simply ignore the problem until you try to save the document. At that point the program may either delete an existing backup file—if one exists on the disk—or simply destroy all or part of your file.

A bad sector warning is also worth heeding. Though DOS will work around physically and magnetically damaged sections of a disk, the problem may spread, inhibiting the operation of the word processor or preventing document saves. If CHKDSK elicits a bad sector message, copy your files onto another disk.

Choose sensible file names. Although DOS is not generous when it comes to file name length—you're limited to 8 characters plus a 3-character suffix or extension—you can classify files in a clear and useful manner if you plan carefully. First, don't use cryptic names. A file name that seems logical today may be meaningless next week. Second, use a file extension to identify like documents. For example, letters might have the extension .LET, memos .MEM, reports .RPT, contracts .CON, and so on.

Answer DOS time and date prompts. Additional filing help is available if you respond to DOS's time and date prompts. DOS puts this information to good use in its file directory, displaying the time and date each file was last revised. Knowing that the file MEMO was written on a certain day at a certain time may provide the crucial clue to help you figure out what's in that mystery file.

Print disk directories. What's the quickest way to find a file stored somewhere on one of 30 disks? You could put each disk in a drive, issue the DIR command, and see what the disk contained. But it would be far faster and easier to read the directory printout that you've cleverly stored with the disk. To print a disk's directory, display the directory on the screen and press <PrtSc>-<Shift>; DOS sends a

snapshot of the screen to your printer. If your word processing program has a more elaborate directory or sorts file names alphabetically (as *WordStar* does), keep a printed copy of this directory with the disk also. If directory printouts are faithfully updated, your next search for a file could be much shorter.

Create special directories. If you require a more detailed record of disk contents, maintain a file on each disk to serve as an expanded directory. This file could list time spent on a document, remarks about its contents, and the initials of the person who last revised the file. Remember, though, that DOS won't manage this special directory—you have to create and maintain it yourself.

Spelling Checkers

Contrary to most manufacturers' claims, spelling checker programs are not proofreaders. A spelling checker won't spot words that are spelled correctly but misused or point out syntax errors. Remember too, a spelling checker is only as good as its dictionary; most dictionaries do not exceed 100,000 words and must be fine-tuned to recognize and accept the technical terms and proper nouns common to your discipline.

Add words prudently. Although this might seem obvious, words that you habitually misspell can slip into a spelling checker's lexicon. Even if you are sure of an entry's spelling, confirm it with a printed dictionary. Furthermore, add words sparingly—the larger the dictionary, the slower the spelling checker performs.

Merging

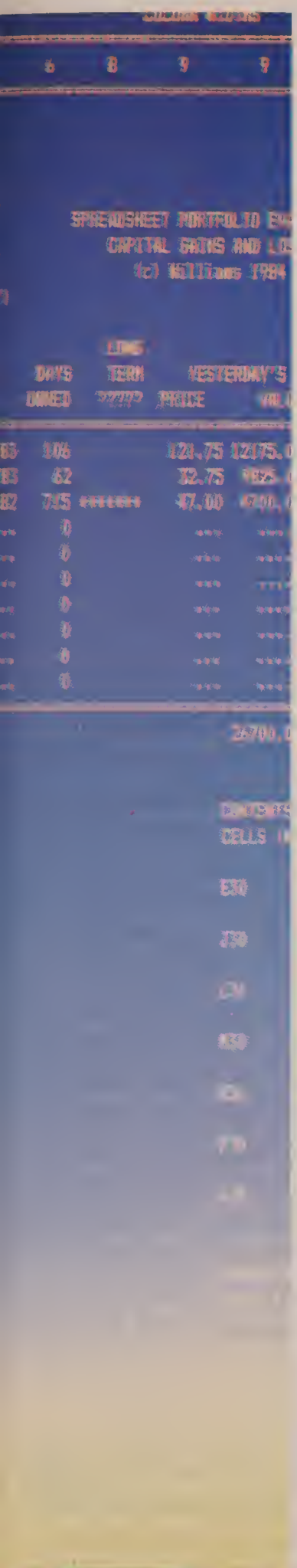
Merge creatively. Though grinding out form letters is the stock-in-trade of most merge programs, they can also perform other functions. For example, you can use a merge program to chain several files (separate book chapters, for instance) into one mammoth manuscript with continuous page numbering. Or if your word processor cannot queue print requests, you can string the documents together and print them in a batch instead of repeating the printing sequence over and over again.

Manage the data file. Some merge programs will start a merge from a specified location in a data file; others dictate that all entries in the file be merged. In the latter case, if the printer malfunctions or chews up a letter partway through the merge, you cannot back up and redo the last record. One remedy is to copy the remaining, unmerged portion of the data file to a new file and use that to finish the merge.

While the suggestions offered here are not all-inclusive, they can get you started on the path to simpler and saner word processing. Still, there is no substitute for experience, so don't be afraid to experiment with your word processor; discover its hidden strengths and find ways to tiptoe around its weaknesses. Just remember one rule: Always use a copy of your program and data disks in any experiment.

Terry Tinsley Datz is a freelance writer specializing in word processing applications. Her last book, Processing Words with Your PC, PC XT or PC Compatible, *was published by the Hayden Book Company.*

TODAY'S DATE
Enter Purchase
STOCK # OF
SYMBOL SHS. PRI
IBM 100
AMD 300 30
DJ 100 2
TOTALS:
CONTENTS OF
CELLS



Introduction to Spreadsheets

An electronic spreadsheet can transform your fanciful financial speculations into the numbers you need to plot the future course of your business. A look at how this powerful tool works and what it can do for you.

Harry Miller

As its name suggests, an electronic spreadsheet is simply the computerized equivalent of an accountant's worksheet. Like its paper counterpart, an electronic spreadsheet is a grid of columns and rows that enables you to organize information in a standardized, readily understandable format.

Spreadsheets can be used to perform almost any task that had previously been done with pencil and calculator. Spreadsheets are commonly used for preparing budgets, evaluating proposals, comparing alternatives, and measuring results. To these tasks the spreadsheet brings increased efficiency and productivity. Compared to pencil and calculator, the spreadsheet is faster, more flexible, and less error prone. Once you begin using a spreadsheet to make calculations, you will find yourself considering more options and forecasting further into the future because the spreadsheet will eliminate much of the tedium associated with accounting tasks, leaving you free for creative decision making.

Spreadsheet Grammar

The intersection of a vertical column and a horizontal row in a spreadsheet creates a "cell." A cell can contain either a label (i.e., text) or a value (i.e., a number or a formula).

Formulas create relationships between values in specified cells. For example, you might want to add a column of numbers in cells B2, B3, and B4 and have the result appear in cell B6 (see Figure 1). To do that, cell B6 would contain a formula that depended on the values in the other cells. The formula might look like '+B2+B3+B4' or '@SUM (B2..B4)'. Going one step further, you might want to add several column totals across the spreadsheet, perhaps to determine the annual total of the quarterly expense columns. The formula (in cell G6, which is the 7th column) to calculate the annual total would depend on the value of the cells to the left of it (cells B6 to F6). Formulas can be much more complex than simple sums; they can contain high-level financial calculations such as internal rate of return or intricate mathematical expressions such as logarithms or trigonometric functions.

When you type in a new value and press <Enter>, the change ripples through the model as the values of all the dependent cells are recalculated.

The underlying concept of formulas is that they determine the value in one cell depending on values in other cells. Once you master this basic concept, spreadsheets are relatively easy to use. What's important is learning to rethink and express business relationships in terms of values. For example, profit = income − expenses, or administrative expense = 15 percent of revenue. Once you have defined those relationships, you can analyze almost any situation that can be represented by numbers.

One of the reasons for the electronic spreadsheet's popularity is that it presents and works with data in a tabular format that is similar to what most managers encounter in their daily work. But the true magic of the spreadsheet lies in its ability to project and evaluate alternatives–the proverbial "what if" analyses. The principle of interrelated cells makes it easy to see the effects of changing assumptions immediately. When you type in a new value and press <Enter>, the change ripples through the model as the values of all the dependent cells are recalculated.

Common Features

Although programs vary, most electronic spreadsheets share a basic set of features. These features are implemented either by spreadsheet commands that usually affect large blocks of cells or by formulas that are tied to individual cells.

The following is a list of some of the most common spreadsheet commands.

Copy enables you to copy the contents of a cell (label, value, or formula) or group of cells into another cell or group of cells. Most programs automatically adjust copied formulas to reflect their new locations; that is, the relationships in the formula stay the same, only the locations change.

Delete removes the column or row at the current cursor position and makes the necessary adjustments to subsequent cell addresses.

Format controls the way in which individual cells, columns, rows, or blocks are displayed. You can usually specify the width of a column, the number of decimal places displayed, whether the text or numbers in a column will be right- or left-justified or centered, whether or not thousands will be separated by commas, and whether negative numbers will be preceded by minus signs or surrounded by parentheses.

Insert adds a row or column anywhere in the spreadsheet and automatically adjusts the cell addresses of all cells that move.

Load or *File Retrieve* fills the screen with a spreadsheet file that has been stored on a disk.

Move takes the contents of a cell or group of cells to a cell or group of cells at a different location or locations in the spreadsheet. Unlike Copy, Move does not leave a copy of the contents in the original cell or cells.

	A	B	C	D	E	F
1		Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec	Annual
2	Food	1200	1320	1452	1597	5569
3	Rent	2100	2100	2100	2100	8400
4	Utilities	450	495	545	599	2088
5		---	---	---	---	---
6		3750	3915	4097	4296	16058
7						
8						

Figure 1: Simple spreadsheet relationships. Cells in row 6 show the sums of the rows above them, and cells in column F add the values of the cells to their left and display annual totals.

Print provides various methods for getting all or part of the spreadsheet onto paper.

Save places the current spreadsheet in a disk file.

Titles protects a row or column so that it is displayed at the top or the left edge of the screen, regardless of the manner in which the rest of the spreadsheet might scroll by.

Window splits the screen either horizontally or vertically so that distant portions of a worksheet can be viewed side by side.

A function common to most spreadsheets is @SUM, which is used to add a column or row of numbers. Most spreadsheet programs also include some higher mathematical functions, such as average, absolute value, square root, sine, tangent, cotangent, logarithm, and exponentiation. The @LOOKUP function finds values from a previously entered table—a very useful feature for tax calculations, for example. Financial functions such as internal rate of return and net present value are also common.

Advanced Features

As an increasing number of spreadsheet packages are adapted to take advantage of the PC's unique capabilities, many advanced features are becoming standard. Some software companies sell one program or a closely related group of programs that perform a variety of applications, such as spreadsheet, data management, word processing, business graphics, telecommunications, calendar, and project management. These "integrated" packages facilitate your natural thought processes. For example, a data management problem or a spreadsheet question may come up while you are in the middle of a word processing file. With an integrated product you don't have to exit one program, remove the disk, put in a different application, and start up again. You merely place the first program on "hold," call up the other program on the screen, do your work, and then return to the first program. This integrated approach makes short work of exchanging data among various applications.

Some spreadsheets enable a user to redefine the meanings of certain keystroke combinations. These redefinitions, called macros, can be quite complex.

Several software companies now offer products that integrate applications at the operating system level. This means that you can use individual application programs from different software vendors and still have the convenience of moving easily from one application to the next while retaining the ability to transfer data among applications. IBM's *TopView*, VisiCorp's *Visi On*, *Microsoft Windows*, Digital Research's Concurrent PC-DOS, and Quarterdeck's *DesQ* are examples of such integrated "environments."

Some spreadsheets enable a user to redefine the meanings of certain keystroke combinations. Labels, formulas, and commands that would normally require many keystrokes can be stored as one- or two-

Code	Date Mo	Da	Amount
DEPT2	1	12	1000
DEPT2	1	22	5500
DEPT3	1	25	1000
DEPT1	2	3	3000
DEPT2	2	15	4000
DEPT1	3	18	1000
DEPT3	3	23	5500
DEPT3	4	16	3000
DEPT3	4	19	4000
DEPT1	4	22	3000
DEPT1	4	25	1000
DEPT1	5	4	5500
DEPT2	5	17	4000
DEPT3	6	1	1000
DEPT2	6	25	3000
DEPT2	6	27	5500

DATA TABLE FOR SUBTOTALS BY CATEGORY AND MONTH

	Code		
Mo	51000 DEPT1	DEPT2	DEPT3
1	0	6500	1000
2	3000	4000	0
3	1000	0	5500
4	4000	0	7000
5	5500	4000	0
6	0	8500	1000

Figure 2: A 1-2-3 data table. The table calculates sums for each combination of variables (month and code).

key commands. These redefinitions, called macros, can be quite complex and can include long strings of commands with text or cell references embedded in them.

As you might imagine, keyboard macros can significantly save time. A keyboard macro may replace a very short but awkward cursor movement that is frequently used. If you have to enter data in the first and fifth columns of each row, a simple cursor-movement macro (e.g., {down}{left}{left}{left}{left} in *1-2-3* by Lotus Development Corporation) can be very helpful and satisfying.

In addition, key redefinition (via either the internal capabilities of the program or a separate keyboard macro program such as *ProKey*) can liberate keys that have several functions. For example, the cursor movement function of the arrow keys on the numeric keypad could be transferred to another part of the keyboard, freeing the numeric keypad for quicker data entry.

To date, *1-2-3* is the only program that has an automated data table feature. This impressive function lets you define a matrix of possible combinations of variables (such as the month and the code number for a given profit center, as in Figure 2) to be used in a model. The data table function runs through the spreadsheet model using each combination of variables in turn and reporting the results in the matrix.

Comparison Shopping

Although most spreadsheet programs perform the same functions, programs differ significantly in style and capability. Almost any of the best-selling spreadsheet programs will perform simple budgeting and projection tasks. But some spreadsheet programs approach these tasks in a manner that more closely matches the way you like to work. You should consider how each of the programs you look at handles the following features.

Command structure and menu style. Although most spreadsheets use the same basic commands, the method of issuing those commands can vary greatly. *VisiCalc* and *SuperCalc* display a prompt line of initials at the top or bottom of the screen that represents possible command choices; *1-2-3* uses a menu of full-word commands supplemented by a one-line description of what the currently selected command does or what choices are available at the next level. For flexibility, *1-2-3* also lets you issue commands by typing their initials.

On-line help. At its best, on-line help means that by pressing a key you can have access to one or more screens that explain the function being used and describe what you can do next. This type of context-sensitive help screen can save time that would have been spent flipping through a user manual. At the other end of the spectrum, a call for on-line help

would display a skimpy description with little (if any) information about commands that might be currently appropriate.

Data capacity per cell. If long labels are necessary or if an application requires especially long formulas or a data field must be longer than most spreadsheet data, the limitation on the number of characters that will fit in a single cell can make a difference. Maximum cell capacities range from as few as 80 to as many as 8000 characters. Capacity is different, by the way, from maximum column width. Some spreadsheets let you store more characters in a cell than are displayed.

Maximum spreadsheet size. Perhaps more important than cell capacity is the spreadsheet's maximum size, as measured by the number of columns and rows it can contain. Typical spreadsheet applications use small areas, but when you need a few more cells, size becomes critical. *VisiCalc, SuperCalc,* and *Multiplan* spreadsheets can encompass 63 columns and 254 rows. *1-2-3* worksheets can contain 256 columns and 2048 rows.

Absolute size specifications can be misleading, however. Values, labels, and formulas take up different amounts of memory. To fill every cell in a *1-2-3* worksheet, you'd have to use only values (no formulas) and have a computer loaded to the brim with RAM (random access memory—the computer's main memory, consisting of chips in the system unit).

If a data field must be longer than most spreadsheet data, the limitation on the number of characters that will fit in a single cell can make a difference.

Programs also differ in the way they store blank cells. For example, *1-2-3* reserves enough memory to hold a spreadsheet whose size is determined by the cells furthest down and to the right that contain data, and it continues to reserve that amount of memory even after that data is erased. To visualize this, think of a blackboard with figures on it; even when the figures are erased, the blackboard continues to exist. This means that to fill a worksheet of equivalent size, you might need much more memory for *1-2-3* than for some other programs.

Merging worksheets. Microsoft's *Multiplan* takes a different approach to spreadsheet size than does Lotus's *1-2-3*. Although *Multiplan* can use only 64K of user memory (RAM), its ability to link worksheets means that you can create "virtual" (or "conceptual") worksheets of almost unlimited size. When a large worksheet must be split into smaller ones, the resulting worksheets are either dependent or supporting. A supporting worksheet feeds information—in the form of a range of cells—to a worksheet called the dependent worksheet. Sales figures from a company's regional offices, for example, would constitute supporting worksheets; those figures can be gathered into a dependent worksheet that consists of a companywide quarterly sales summary. In this case, the whole summarizes the parts—and depends on those parts.

If a value designated for such a connection is changed on the supporting worksheet, the relevant formula automatically updates related values on the dependent worksheet the next time the dependent worksheet is used. This is a slightly tricky but powerful technique, since smaller worksheets are invariably easier for a spreadsheet user to handle than larger ones.

Naming cells and ranges. Some spreadsheet programs let you assign a name to a cell or a range of cells. This feature adds convenience and flexibility. Referring to a range of cells called "prices" is easier than remembering that the prices are in cells A1 through A15. More important, if a formula refers to the range called "prices," it will still find those prices if the range containing them is moved to another part of the spreadsheet. If you failed to name the range or had a program that lacked this feature, when you moved the range you would have to go back and manually change all the formulas that refer to that range to reflect the new location.

Speed of calculation. A spreadsheet's calculation speed depends on several factors. Does the program do all of its work in memory, or must it frequently access the disk? (The mechanical disk drive is

(continues on page 256)

A Few Spreadsheet Tips

Create a separate data input area to hold assumptions, opening balances, base figures, and other data. The best place for the input area is the upper left corner of the worksheet. The body of the worksheet should contain only formulas and references to data input area cells. That way you can easily see what assumptions the results are based on.

Establish separate areas in the spreadsheet for data input, criteria (for sorts or searches), and output (results), and then create an area to store all keyboard macros. The data management input area stores all the data that will be searched, sorted, or extracted, and it might be synonymous with the worksheet itself.

Date and number successive versions of the model so that you'll know you are incorporating the latest set of assumptions and data. You might also label the spreadsheet with the author's name and the file name under which the model is saved.

Print out all of the formulas. A printed version allows the methodology as well as the mechanics of the model to be audited.

Use templates. Setting up a basic model of a spreadsheet and saving a copy of the model with no data (a template) will allow you to use that model again and again without wasting time re-creating it. In this way, you've reserved space and left behind the instructions (formulas or macros) for that structure. Just load the file that holds the template you've created, key in the data, and save the resulting worksheet under a unique name. Leave room at the top of the template for the date and notes about what data it contains.

Once you become proficient using templates, you might consider writing keyboard macros that build the templates "on the fly." Such macros take up less memory and disk storage space than templates but may load a little slower.

Include cross-checks. A prudent spreadsheet model should calculate important values more than one way to cross-check the results. You should have an @IF statement signal when a

	A	B	C	D	E	F	G
1		Jan-Mar	Apr-Jun	Jul-Sept	Oct-Dec	Annual	Cross-check
2	Food	1200	1320	1452	1597	5569	
3	Rent	2100	2100	2100	2100	8400	
4	Utilities	450	495	545	599	2088	
5		---	---	---	---	---	
6		3750	3915	4097	4296	16058	16058
7							0
8							

Figure A: The formula in cell F6 calculates the annual total as the sum of cells B6 to E6. The formula in cell G6 calculates the same value, but it does so as the sum of column F. The formula in cell G7 says: if cell G6 is not equal to cell F6, display a row of 1s; otherwise, display a zero.

cross-check discrepancy is found. For example, in Figure A the annual total in cell F6 could also be calculated as the sum of cells F2 to F4. As a cross-check, you could type the formula **@SUM(F2..F4)** in cell F6. Then in cell G7, type **@IF(G6 < > F6,11111111,0**. That will display a 0 if the sum in G6 matches the number in F6 and will display a row of 1s if there is a discrepancy.

Test spreadsheet models using simple and predictable data. If a model works correctly with simple data, it's more likely to give good results when it counts.

Name ranges or single cells as much as possible and use those range names in formulas. You're much less likely to make an error in Total Sales − Total Expenses than in A20 − A40.

Once you've checked the accuracy and appropriateness of a formula, use the range- or cell-protection feature to avoid accidentally corrupting the validity you worked so hard to establish.

Experiment. It's easy to change values and watch the results. Do it often and you will get a better feel for spreadsheet software. Substitute some wildly optimistic or pessimistic values for your assumptions. You may gain insight into the way your model works that you wouldn't perceive under normal circumstances.

much slower than the purely electronic process of manipulating data in memory.) What language is the program written in? (Assembly language is faster than C, which is faster than Pascal or BASIC, which are faster than the p-System.) What mathematical methods and algorithms are used? What degree of accuracy is attained?

A spreadsheet's calculation speed depends on several factors. Does the program do all of its work in memory, or must it frequently access the disk?

Testing the relative speed of spreadsheet programs usually requires a reasonably large model. Such a model can be built by copying a few formulas over a large area of the worksheet.

Automatic and manual calculation. Most spreadsheet programs automatically recalculate an entire spreadsheet each time any value is changed. As a worksheet gets larger, the time spent watching the program redraw the screen becomes increasingly significant. Some programs let you set the calculation mode to manual so that the worksheet is not recalculated until you give the command.

Forward and circular references. Most spreadsheet programs recalculate row by row, calculating the formulas in row 1, then row 2, and so on. Some programs let you change the order of recalculation to column by column. Either way, there's a potential problem: if a formula depends on a value that is recalculated after the formula is calculated, you may get an error known as a forward reference—a cell formula that refers to a value that has not yet been calculated.

Some sophisticated spreadsheet programs such as *1-2-3* avoid the forward reference problem by using a "natural order" of recalculation. A formula is not recalculated by *1-2-3* until the program has calculated all of the formulas on which it depends. If *1-2-3* finds a forward reference, it goes forward and calculates the forward formula.

Virtually no spreadsheet, however, can deal with the circular reference, in which one cell's formula depends on a second cell, whose formula depends on the value of the first cell. The exception is *Multiplan*, which relies on a technique called "iteration" to calculate circular references. Iteration is a process of repeated calculation that leads to conclusions of increasing accuracy each time recalculation is performed, until the correct answer is achieved. Consider, for example, the calculation of a salary bonus based on a company's net profit; the net profit itself is affected by the size of the bonus paid.

In the overwhelming number of instances, however, a circular reference reflects an error. Only in a small class of problems—primarily those concerned with specialized financial and engineering applications—is a circular reference a useful technique.

Data entry forms. One of the nice things about spreadsheets is that they display data in an easy-to-use tabular fashion. But entering data into such a format (particularly with a large spreadsheet) has all the efficiency of hunt-and-peck typing.

Some spreadsheets (*Context MBA* is the most impressive example) have forms modes that enable you to enter data on a screen form of your own design. The data is then automatically copied into a spreadsheet's tabular format. Some other spreadsheets have the potential, if not the built-in capability, to accomplish this with macros.

Flexible cursor control also facilitates data entry. A spreadsheet program should make good use of the PC's keyboard, including the <Home>, <End>, <PgUp>, <PgDn>, and function keys.

A spreadsheet is a handy tool, but it is not a decision maker. A spreadsheet assembles and organizes all the data and facts about a decision or a plan and then performs calculations that indicate the consequences—for example, profit or loss or cash flow. Remember—you control the assumptions and you control the results.

Harry Miller is the Editor of PC World.

Our customers are our best advertising.

Mr. Mike Filicetti,
Vice-President, Data Integrity Inc.

"Our cash flow is the best ever with our receivables now being collected in 30 days or less. For the past 2 years, our Atlantis accounting system has more than paid for itself. Financial reports are virtually up-to-the-minute, receivables are kept current and our operating costs have been reduced overall. Besides, now I spend my time running the business, not chasing receivables."

It's the people who use Atlantis accounting software who are our best advertising. With an emphasis on ease of use, Atlantis software provides the efficient and effective solution to today's information needs. That's just what we're all about —helping today's small business do business!

Ask your local computer store about Atlantis or call us directly at (416) 624-7583.

ATLANTIS
SOFTWARE

The Future Wave in Software. Today.

Circle 119 on reader service card

DOES WORKING ON LOTUS 1-2-3 MAKE YOU SEE RED?

Granted, Lotus 1-2-3™ can be a fast spreadsheet.

Except when you first buy it, take out the five floppy disks, study the manual to figure out which ones do what, put the plastic doohickey over the keyboard, and begin reading about all the installation procedures you need to get the thing up and running.

Or if you never make a circular calculation (any simultaneous equation, even something as simple as "bonus equals 10% of profit after bonus") when doing a complicated spreadsheet.

By the time 1-2-3 calculates it correctly, you may h retired.

Or if you'd like to plot your data with a single keystroke, because it can take several minutes (including a disk change) just to start the process.

Or if you'd like to quickly create a file directory under program control. 1-2-3 can't do that at all.

What's the point of all this?

We'd like you to go down to

ur software dealer and see a new product called
perCalc® 3 Release 2, which, unlike Lotus 1-2-3, does
of the above.

Along with a larger spreadsheet. Vastly superior
aphics. Incredible speed (that becomes even faster when
ed with the 8087 or 80287 math co-processors, which
-3 doesn't support). And more.

For a lot less money.

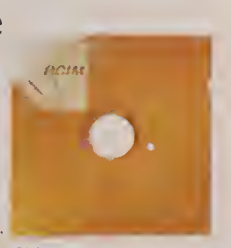
All on one disk that you can run right out of the
x. (Our lawyers want you to know we include an additional file disk. Which also contains the popular printing program Sideways™, so you'll never have to cut and paste wide printed reports together again. Unless you use 1-2-3.)

But don't believe us about all this. Go take a look.

After you do, one thing should become obvious.

What are you waiting for?

SORCIM / IUS
MICRO SOFTWARE
A Division of Computer Associates International, Inc.



985 Computer Associates International, Inc. SuperCalc is a registered trademark of Computer Associates International, Inc. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. Sideways is a
demark of Funk Software, Inc

Circle 823 on reader service card

Getting to First Base

A tutorial for beginners that explores the purposes and fundamental concepts of data base management systems and explains their structure, use, and technical terms.

David Frankel and Michael Guttman

All organizations and most individuals have to organize information systematically for easy retrieval. Most people keep track of appointments, correspondence, and personal budgets. Businesses need records of inventory, creditors, and customers.

Many software packages for the PC are designed to make record keeping easier. These programs are called data base management systems (DBMSs) or data base managers. A data base is simply information collected on disk. A DBMS is a program that organizes and provides easy access to a data base.

Before using a DBMS, you need to understand the basic record-keeping concepts common to both manual and computerized systems. A hypothetical example of a manual record-keeping system used in a typical small business will help illustrate these concepts.

Manual System

Imagine you are running the business office of a small retail auto parts store without a computer. You maintain two sets of records: One set contains information on every parts supplier your company does business with; the second set lists the items in your company's inventory. You keep each set of records in a separate file drawer.

The set of supplier records contains a folder for each supplier listing the name, street address, city, state, and zip code. You label the folders with the suppliers' names and arrange them alphabetically.

The set of inventory records has one folder for each inventory item. Each folder contains the stock number, a title or description of the item, the quantity in stock, the quantity on order, the cost, the list price, and the supplier's name. The folder is labeled with the stock number, and you arrange the folders in numerical order.

DBMS Terminology

The manual record-keeping system just described makes it easy to understand standard data base terminology. In the office each set of records is contained in one file drawer; in a data base each set of records is called a *file*. In this example you have a supplier file and an inventory file.

Each folder in a file drawer is represented in the data base by one *record*. For example, the folder labeled "Amalgamated Auto Supplies" is one of many

records in the supplier file. The information in this record pertains solely to this supplier. Similarly, each data base record in the inventory file represents a folder with information about a particular inventory item.

In a data base the categories of information in each record are called *fields*. Each record in a data base file has the same fields. For example, each record in the supplier file includes the fields for name, street address, city, state, and zip code. The fields for each record in the inventory file are stock number, title, quantity in stock, quantity on order, cost, list price, and supplier's name. Figure 1 illustrates the hierarchy of files, records, and fields.

One field in each file plays a special role. The purpose of this field, called the *unique key*, is to identify each record unambiguously. The unique key for the supplier file is the supplier's name, because each supplier has a different name. The unique key for the inventory file is the stock number, because only this field precisely identifies each record.

Related Files

A DBMS avoids repeating information in more than one file whenever possible. Instead, files are related so that you can refer to a secondary file when you require further information on a field in the first file. Although the simplest DBMS software does not allow you to define relationships among files, we will assume the use of a slightly more sophisticated package in our example.

An inventory record contains the field for a supplier's name, but the rest of the information about that supplier is in a record in the supplier file. Because the unique key for the supplier file (supplier's name) is included as a field in the inventory file, the inventory file is said to be related to the supplier file.

Suppose you decide to keep a file of all inventory item purchases. You create a purchases file that contains a record for each purchase that shows the purchase number, the stock number, the quantity purchased, and the date of purchase. In this file the purchase number is the unique key.

Each purchases record need not contain inventory information about the purchased item (such as price or supplier's name) as long as it includes the item's stock number. Since the stock number is the unique key for the inventory file, you can use the purchases file to call on the inventory file if you need

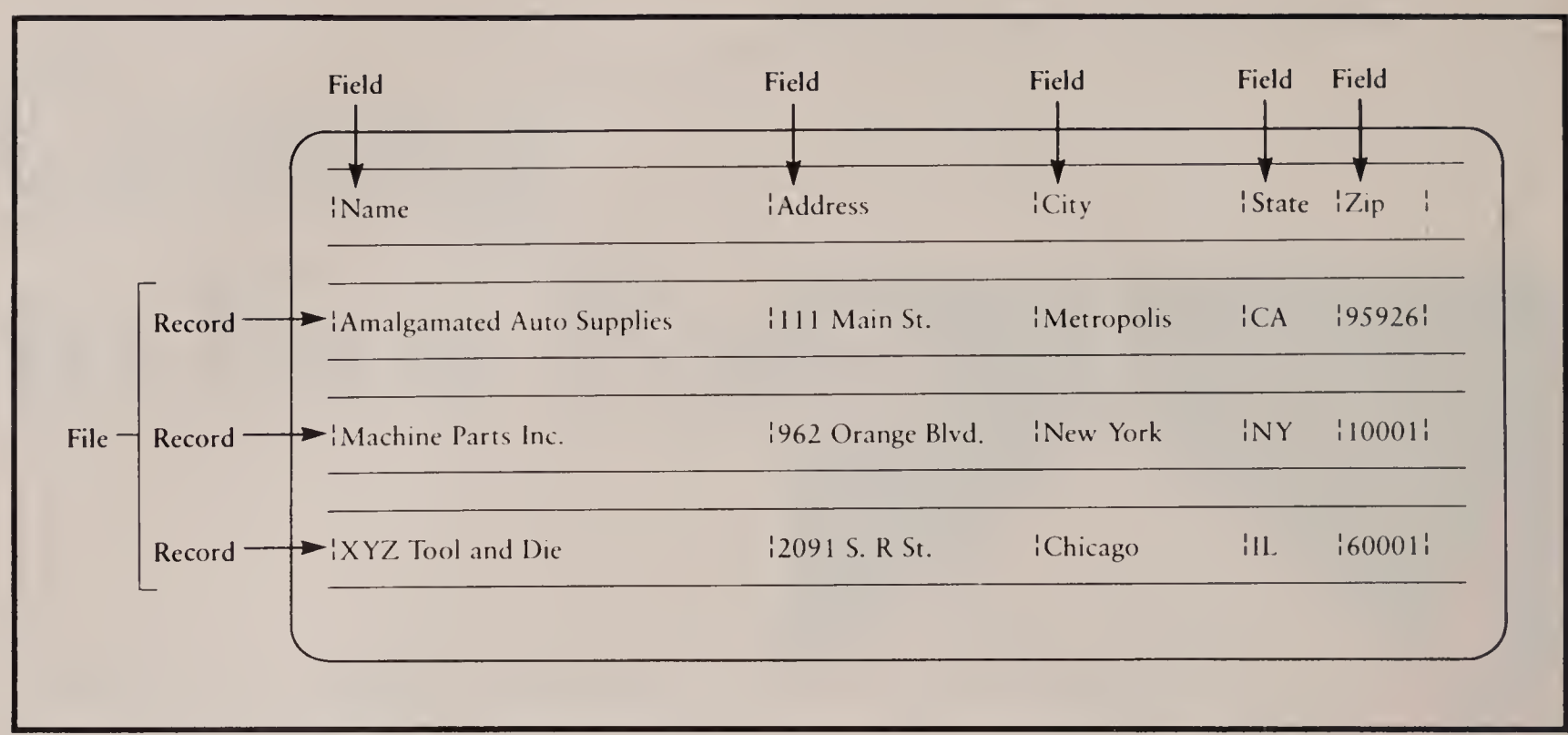


Figure 1: Fields, records, and files. The fields define the structure of each record. A file is a collection of records that all have the same fields.

more information about an item. Figure 2 illustrates how the supplier file, the inventory file, and the purchases file are related.

A DBMS that uses related files performs other special functions. In the parts store example, when you enter a stock number into a record in the purchases file, the DBMS checks for a record in the inventory file that has that stock number as its unique key. If the number entered is not found in the inventory file, a screen message appears to that effect, asking you to enter the correct number. When the DBMS finds the stock number in the inventory file, you can display other information, such as the description of the item, on the screen.

Designing a Data Base

When using almost any DBMS, whether simple or sophisticated, the first step is to define the files. The DBMS prompts you to supply a title for each file, the maximum number of records it can contain, and its total number of fields.

You then define each field by entering the title, the type, and the maximum length. The title is an identifying name for the field, such as address or stock number. The most common types of fields are numeric, character, logical, and date. A numeric field contains only numeric data, such as quantity or price. A character field, also called an alphanumeric field, can hold any characters–numbers, letters, or other symbols. An address field is an example of a character field. A logical field can be used whenever a simple yes or no answer is sufficient. The field type is important because the DBMS stores each type of data differently.

Specifying the length of a field means choosing the number of digits (whether letters or numbers) the field can hold. To specify the maximum length of a field, decide what the largest piece of data will be for any record in the file. For example, if no address will ever exceed 40 characters for any supplier record, then the maximum length of the address field should be 40. If you never keep more than 200 of any inventory item in stock, then the maximum length for the quantity-in-stock field should be 3. Careful choice of field lengths will result in the most efficient use of disk space. You don't need to specify the maximum length for the date field because it is always the same.

To finish defining the files, indicate the unique-key field for each file. Figure 3 shows typical prompts and responses for defining the attributes of a file.

Data Entry

Once you define the files and fields, you can enter information into the files. When you select the data-entry function, the DBMS prompts you to enter the name of the file that will hold the data. After the video screen clears, a new screen appears that lists the titles of all the fields in that file. Next to each field title is a space, marked by brackets, for entering data. Figure 4 shows a sample data-entry screen completed for the supplier file.

As part of the data-entry function, you may choose to enter new records or to list (display), edit, or delete an existing record. If you are entering a new record, the cursor moves to the space next to the name of the first field. After typing in the data for the first field, you press <Enter>, and the cursor moves to the space next to the name of the second field. When you have entered information for each of the fields, one record for the file is complete. The spaces for entering data are then cleared, and you repeat the process for the next record.

For each field the DBMS checks that the data entered conforms to the field type. For example, if you enter "Amalgamated Auto Supplies" for the zip code, a screen message tells you that the zip code is a numeric field. You then have the opportunity to reenter the zip code.

If you choose the list option for an existing record, the cursor moves to the unique-key field. You enter the information that identifies the record you want to see. To display an item from the supplier file, for example, you enter the name of the supplier you want. If the DBMS finds the record you've asked for, the information appears in the spaces next to the field names. A screen message informs you if the DBMS does not find the record.

If you choose to edit the record, a designated key moves the cursor to the field you want to change. After entering the new information, you move the cursor to the next field you want to edit. Pressing another key indicates the editing is complete.

If you select the delete option, a screen prompt asks you to confirm this request. The record is then removed from the file.

Think of the data-entry screen as an electronic business form. When entering data you are essentially filling out a form on the screen. A well-designed DBMS should make data entry easy and efficient.

Reports

The DBMS functions described so far would be of little use unless you could easily get an overview of the information you've collected. A report is an overview of a selected portion of data. The DBMS allows you to specify the portion of the data you want for the report and the format in which it will appear. A screen prompt asks you to give the report a title and to supply the name of the file you wish to view.

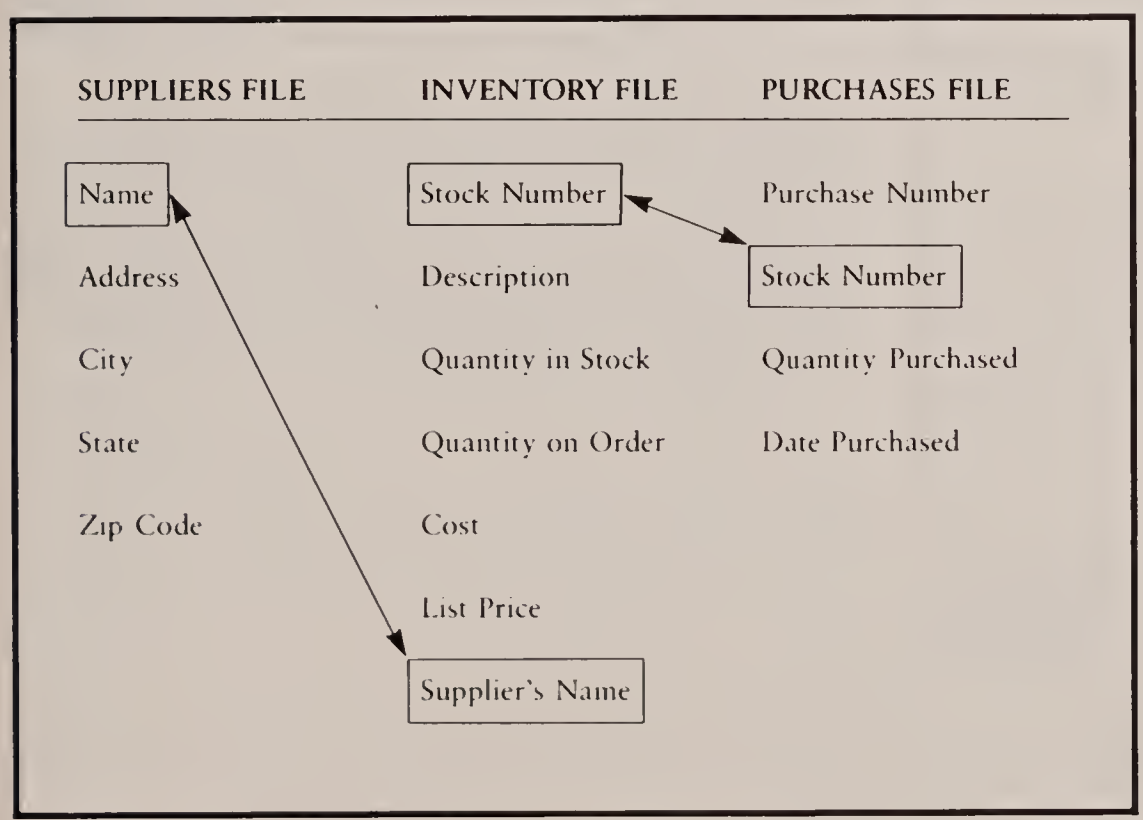


Figure 2: Related files. The field in one file is the key field for another file, so you can always find more complete information without duplicating your data.

```
ENTER FILE NAME      : SUPPLIER FILE
MAXIMUM NO. OF
  RECORDS            : 150
NO. OF FIELDS        : 5

FIELD #1
  TITLE              : NAME
  TYPE               : CHARACTER
  MAXIMUM LENGTH     : 25

FIELD #2
  TITLE              : ADDRESS
  TYPE               : CHARACTER
  MAXIMUM LENGTH     : 15

FIELD #3
  TITLE              : CITY
  TYPE               : CHARACTER
  MAXIMUM LENGTH     : 13

FIELD #4
  TITLE              : STATE
  TYPE               : CHARACTER
  MAXIMUM LENGTH     : 2

FIELD #5
  TITLE              : ZIPCODE
  TYPE               : NUMERIC
  MAXIMUM LENGTH     : 5

WHICH FIELD IS THE UNIQUE KEY? 1
```

Figure 3: When you define a file, you select the title, type, and length of each field.

```
                    SUPPLIER FILE

NAME     : AMALGAMATED AUTO SUPPLIES
ADDRESS  : 111 MAIN ST.
CITY     : METROPOLIS
STATE    : CA
ZIPCODE  : 95926

1) ENTER NEW RECORDS
2) LIST RECORD
3) EDIT RECORD
4) DELETE RECORD

ENTER OPTION NUMBER: 1
```

Figure 4: A sample data-entry screen for the supplier file displays the record and lets you handle the information by selecting an option.

You can specify the order in which the records appear on the report by designating a field as the *sort key*. The sort key can be the unique key or any other field. For example, you may want a report from the supplier file that orders the records according to zip code. In this case the zip code would be the sort key. You may request that totals for numeric fields appear at the end of the report. Once you define the report format, you can recall the report by name at any time. A *master list* is a common type of report that shows all the records contained in a file. The master list is divided into columns, one column for each field. The names of the fields appear above the columns. Each horizontal line on the report represents one record. Another type of report is a transaction log, which shows the records in a transaction file in much the same way that a master list shows the records in a master file.

Other Features

In addition to defining related files, sophisticated DBMSs include the following features:

Index file. For a simple DBMS to produce a master list of an inventory file ordered by stock number (or any other field), it must perform a time-consuming sorting procedure.

Some DBMSs have an indexing feature that eliminates this delay. An index file is an auxiliary file that specifies the order of the records in the main file. The *index key* is the field from the main file that you select to determine this order.

The index key doesn't have to be the unique key. For example, a transaction log of purchases could be ordered by date, which is not the unique key for purchases records. Every time a new record is added to the main file, the index file is immediately updated. When you request a report with the records in a particular order, the index file produces the report without any sorting delay.

A DBMS may also allow a main file to have more than one index file. Several fields can serve as index keys so that a file can be reported in a variety of orders, all without the need to sort.

Electronic form. An advanced DBMS offers flexibility for designing electronic data entry forms. You can create forms using a word processor, and you can place field names and spaces for entering data anywhere on the screen. Forms can include instructions and borders, and data can be entered into many files on the same screen.

Report functions. When generating reports, a DBMS can produce subtotals, show totals and subtotals without displaying individual records, select subsets of a file for reporting, produce counts of records that fall into certain categories, and perform arithmetic calculations on numeric fields, such as multiplying cost by quantity purchased to produce an extended price column.

A DBMS can also use unique keys to locate information on related files. For example, a transaction log for the purchases file could display an item description from the inventory file for each purchase.

Think of the data-entry screen as an electronic business form. When entering data you are essentially filling out a form on the screen.

Updating files. Some DBMSs provide a way to update the information in files other than by direct data entry. Returning to the example of the auto parts store, you might want a field in the supplier file called *total purchased*. This field records the total dollar value of all purchases made from each supplier. Upon entry of each record to the purchases file, an advanced DBMS can calculate the dollar value of the sale and add that amount to the total purchased field in the supplier record. To calculate the dollar value of the sale, the DBMS multiplies the quantity purchased data from the purchases record by the item cost contained in the inventory record.

Menus. Some DBMS systems enable you to construct menus for frequently used procedures. You specify the function to be performed for each menu option. Then instead of having to enter several DBMS commands, you can choose one option to perform the desired procedure.

The Changeover

Before the advent of the personal computer, DBMS packages were tools available only to the software houses that developed them. Programmers used DBMSs to produce custom software for their clients. Often these DBMSs were not well integrated and lacked documentation.

Eventually, some software companies realized that general-purpose DBMS programs, carefully integrated and properly documented, were marketable products. These DBMS packages were sold primarily to other software manufacturers or to corporate data processing departments. IBM developed a line of DBMS products for its mainframe computers.

After the personal computer appeared on the scene, DBMS products became available to everyone. Today these products range from simple, inexpensive packages to more sophisticated, costly models. With a general understanding of DBMS features and capabilities, you're better prepared to make the changeover from manual to computerized data management.

David Frankel and Michael Guttman are general partners in Professional Computer Technologies, a consulting and software development company in Chico, California.

What Makes Modems Run?

Translating digital signals to analog and vice versa, the modem acts as a mediator between the PC and the outside world. Yet today's "intelligent" modems can do much more.

Larry Jordan

In the world of data communications, terminals and computers often need to "talk" to each other using human-voice-frequency signals. To use standard telephone lines, a device called a modem must be installed between the terminal or the computer and the telephone system. The modem is the final link between a digital-based device (terminal or computer) and the analog-based telephone system. Without such a device, data communications would not be the booming business it is today, and the PC owner would be deprived of one of the computer's most useful applications.

In the simplest terms, on the transmitting end a modem converts binary (on or off) electrical signals from a terminal or a computer into voice-frequency signals that can be sent over the public telephone system. On the receiving end a modem converts voice-frequency signals transmitted through the telephone system into binary electrical signals that are forwarded to a terminal or a computer. In specialized cases a modem may also receive signals that are transmitted directly to a serial printer.

As shown in Figure 1, modems modulate digital signals (square wave signals carrying information based on a series of digits that are either 1, for "on," or 0, for "off") into analog signals (oscillating signals that carry information based on the variations in amplitude–strength–or frequency of the signal wave) and demodulate analog signals into digital signals. Hence the name *modem:* modulator-demodulator.

Modems are used to produce signals compatible with telephone equipment. The equipment used in the telephone system requires that digital signals from the computer be converted to analog signals for transmission. Without a modem, telephone system amplifiers and filters would alter digital square wave signals into unrecognizable garbage by the time they reached another computer across town.

Another limitation imposed by the quality of public telephone equipment is the rate at which data can be transferred. Most of the modems owned by IBM PC users operate at 1200 bits per second (bps) or less. Data transfer rates as high as 9600 bps can be achieved using the same telephone equipment, but modems providing that capability are significantly more complex and expensive than those operating at lower rates.

Modems can be categorized according to speed, protocols, features, and intelligence (e.g., automation of answering and dialing functions or capacity for storage of dialing directory). They can also be differentiated by housing design: they may be designed to stand alone or to fit in an expansion slot inside the PC's system unit.

Modem Speeds and Protocols

The speed of a modem is determined by the maximum rate at which it can transmit or receive data. That rate is measured in either bits per second or baud. Bits per second is the number of binary digits (0s and 1s) transferred per second, whereas baud is the number of signal events transmitted per second. They differ whenever digital signals are superimposed onto analog signals, resulting in each signal event carrying two or more binary bits.

The classification of modems by speed is as follows: 600 bps or less is considered low speed; 1200 bps to 9600 bps is medium speed; and over 9600 is high speed. High-speed modems require specially installed data communications lines such as the fiber optics networks that are now beginning to appear.

The most common communications device used in personal computer configurations is the Bell 103-compatible low-speed modem. Bell 103 is a communications standard (or protocol) for modulation and demodulation of data signals. Communication at 1200 bps generally uses either the Bell 212A or Racal-Vadic protocol. Almost every modem manufacturer produces Bell 103 modems, but the less expensive models do not support auto-dial and auto-answer and cannot be used to store telephone numbers. Expensive models can be used to auto-dial telephone numbers stored in disk files or in the modem's own memory. Some of the Bell 103 modems can also be set up with host software for unattended auto-answer operation; the Hayes Smartmodem is a good example of this type of modem.

Frequency Modulation

The distinguishing characteristic of the Bell 103 modem is the way it handles transmitted and received data. The originate and answer modes for Bell 103 modems are controlled through frequency shifting. The modem that initiates a communications link is set to the originate mode, and the remote modem that responds and completes the communications link is set to the answer mode. The answer-mode receive frequencies are the same as the originate-mode transmit frequencies. By the same token, the originate-mode receive frequencies are the same as the answer-mode transmit frequencies. The configuration of transmit and receive frequencies means that one modem must be in the answer mode and the other in the originate mode for the communications link to be properly established.

Frequency modulation carries information in variations of the time periods between "peaks" in a signal wave. The wave describes the strength of a signal. The more often the signal is at its highest strength, or peak, the higher the frequency. When digital (on or off) information is translated to frequency-modulated signals, one frequency value indicates an "off" condition (or 0 bit) while a different frequency is used for an "on" condition (or 1 bit).

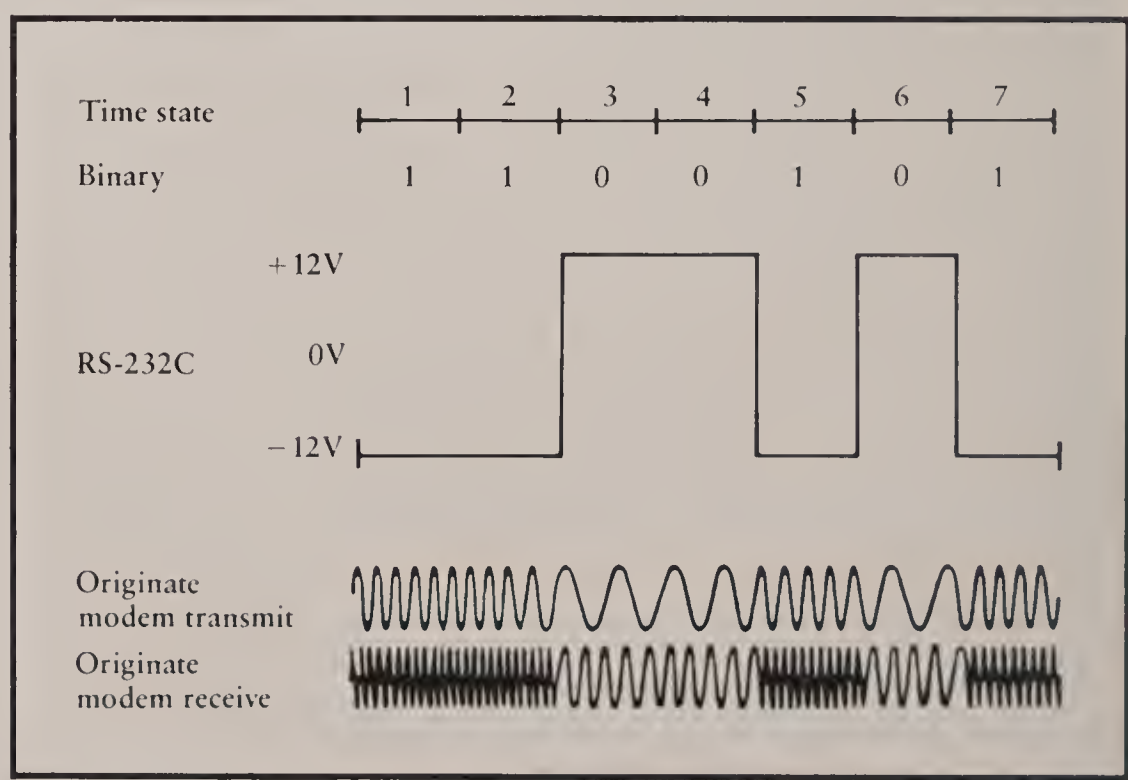


Figure 1: Binary signal frequency modulation. To transmit data, a modem modulates digital square wave signals sent from the PC through the RS-232C serial port and converts them to oscillating analog signals. A similar process converts analog wave signals to digital signals when receiving data.

Bell 103-compatible modems may be configured as originate only, answer only, or originate/answer. If you don't plan to have your modem answer an incoming call from another computer or terminal, you do not need answer-mode capability. But most modems available today provide both modes.

Low-speed modems are excellent for applications that require a great deal of conversation-mode communications or small file transfers. The maximum continuous transfer rate at 300 bps is 30 characters per second (cps), which translates into approximately 300 words per minute—faster than any typist. Another advantage of 300-bps communications is that many people can comfortably read text that scrolls by on the screen at that speed. A final benefit is that some on-line information services charge less for 300-bps service than for higher speeds.

Medium- and High-Speed Modems

For applications that involve frequent transfers of large files or the clustering of input from several terminals, low-speed modems are not a good choice. It takes approximately 1 minute to transfer 2000 bytes of text at 300 bps, which translates to 30 minutes of connect time to transfer a 60K file. Transferring several 60K files results in the computer being dedicated to communications for a significant period of time. If the communications software does not provide batch-mode or multiple-file transfer options, operator support is required during the entire session. For applications of this type, most businesses and an increasing number of individuals choose medium-speed modems.

Most medium-speed modems operate at 1200 bps, but compatibility with other systems varies with the make and the model. Some new 1200-bps modems operate in only half-duplex, limiting the information systems they can be used to access. For example, The Source cannot be accessed by anything but a full-duplex modem. Other modems offer compatibility with either Bell 212A or Racal-Vadic protocol. The more expensive medium-speed modems are compatible with both Bell 212A and Racal-Vadic, and some so-called triple modems support Bell 103, Bell 212A, and Racal-Vadic protocols.

Medium-speed modems differ in several ways from low-speed modems. Instead of shifting frequencies, as is done under the Bell 103 protocol, these modems use a technique called phase shifting, illustrated in Figure 2. Phase modulation, or phase-shift keying, maintains a constant frequency throughout transmission but changes the starting point. The signal transmission always starts at a neutral midpoint, but a shift changes the direction of a signal moving toward either a positive "peak" or a negative "trough." When digital information is translated to phase-shift keying, a 1, or "on," bit is indicated by no deviation or phase change (a 0-degree shift) while a 0, or "off," bit is designated as a 180-degree shift.

Without a modem, telephone system amplifiers and filters would alter digital square wave signals into unrecognizable garbage by the time they reached another computer across town.

The Bell 212A and Racal-Vadic protocols both use phase shifting to increase data throughput, but the signal frequency used as a basis for the phase shifting is different for the two. Therefore, the protocols are not compatible, and the same modem protocol has to be used at both ends of a 1200-bps communications link, adding another level of complexity to going from 300 bps to 1200 bps. Fortunately, most information services offer both Bell 212A and Racal-Vadic compatibility, so PC users can achieve 1200-bps communication without purchasing an expensive dual-mode modem.

Modems that operate at speeds above 1200 bps use more sophisticated electrical-signal manipulation to achieve those rates while staying within the frequency limits imposed by public telephone equipment. Figure 2 illustrates a technique called phase amplitude modulation, a combination of phase shifting and amplitude modulation. It is used in the design of 9600-bps modems that are used mostly for mainframe communications. Modems that operate at 9600 bps are now dropping in price and becoming avail-

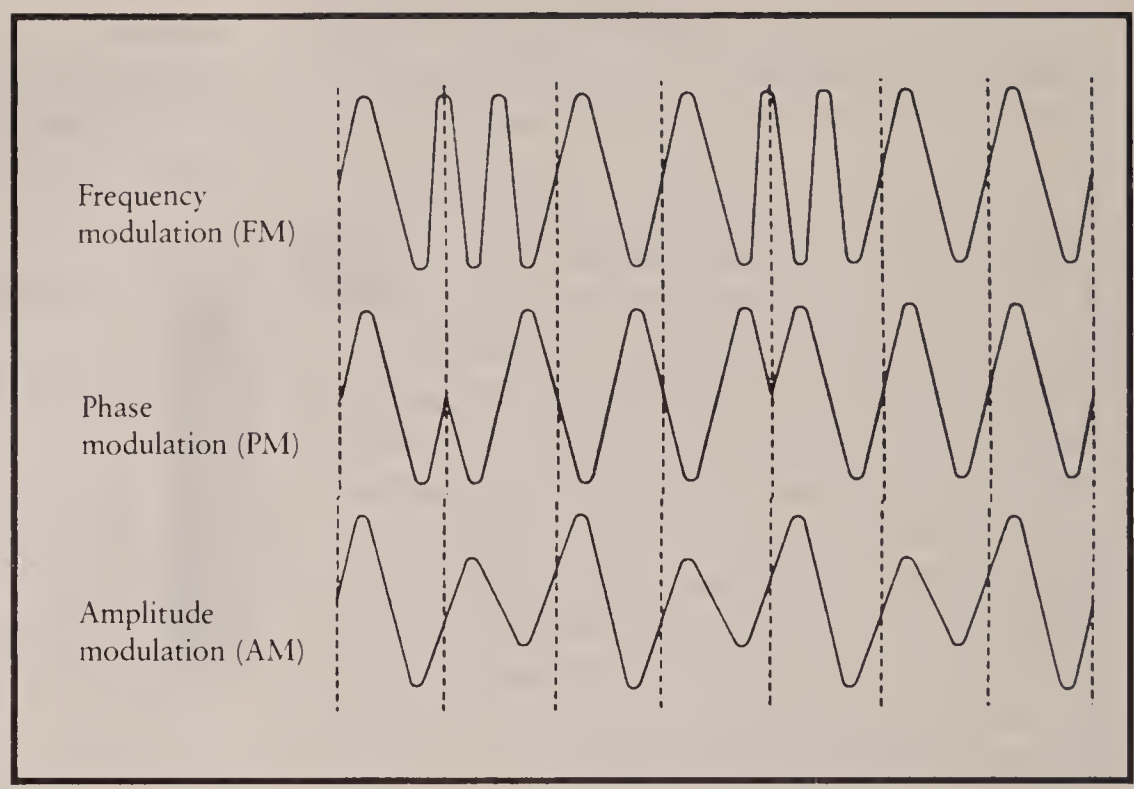


Figure 2: Three digital modulation methods for transmitting digital data over analog phone lines. Frequency modulation is used for 300-bps modems, phase modulation is used for 1200 bps, and amplitude modulation is necessary for communications at higher speeds (4800 bps or 9600 bps).

able for the IBM PC. However, these modems are usually not worth the price unless you frequently telecommmunicate with mainframes or transfer long files.

Modem Features

Besides classification by speed and protocol, modems are often classified by features or level of intelligence. The following explanation of modem features should help you perform your investigation. Keep in mind that many modem features can be used only if your communications software supports them.

Help Command. Many new modems provide command help files. To get that help the user simply enters an H or the word Help while interactively conversing with the modem from the PC keyboard. The help files are usually brief explanations of frequently used functions and commands.

Command Modes. Because of the dominance of the Hayes Smartmodem in the personal computer community, many intelligent modems provide a Hayes Smartmodem-compatible command mode. This mode allows the user to run communications software specifically designed for the Smartmodem. Besides the Hayes mode, some modems also have a unique command mode designed by the modem manufacturer. Switching between the two modes is usually performed by issuing a short command sequence to the modem. The Hayes mode is characterized by an 'OK' response to commands (when the verbal response mode is in effect) and the manufacturer-specific mode is characterized by some other character prompt such as '$' or '<'. The Hayes mode requires a carriage return at the end of a command to initiate its execution, whereas vendor-specific commands may begin execution after a single letter or number is entered at the keyboard.

Command Recognition. Some modems require a specific speed (bps) and parity configuration to recognize commands; others will accept commands regardless of the communications parameters. Modems that accept several configurations often must be either reset through software commands or placed in a dormant mode before a new set of parameters can be used. Others provide an external reset button or an off/on switch that will reset most or all of the parameters. Stand-alone modems can easily be switched off and then back on, but some expansion board modems that fit inside the PC require that the computer be turned off for a power-off reset of the modem.

Command Abort. After a dialing command has been issued to an intelligent modem, you can usually stop the call before it is completed by sending the modem an abort command. Most modems interpret the carriage return or a pair of carriage returns as an abort command. This abort signal interrupts the execution of any modem command before a call is completed and returns the modem to command mode.

Quit Command. Intelligent modems may allow a user to turn the internal monitor programs off with a quit command. This type of modem may also go into dormant mode automatically after a fixed number of minutes of keyboard inactivity. The mo-

dem then remains in a quiet or dormant mode until it receives several carriage returns. This dormant state may be required for data transfer rate (bps) or parity changes. After you change the communications parameters and press the carriage return, the modem senses the new communications parameters and is activated with a matched set of parameters. The modem will usually report its operating speed when the monitor program is reactivated.

This design may also allow the user to specify a longer period of inactivity (or "no activity") or to specify that the monitor never go into the dormant mode. This is a desirable feature if the modem is used frequently with the same host system or with several host systems that have the same communications parameters.

Manual Dial. Modems that provide their own dialing directory also allow the user to dial a telephone number manually from the PC keyboard. The command typically starts with either an ATD or a D followed by the telephone number and a carriage return. The modem may also allow a batch-mode call using special telephone number dialing prefix and suffix character strings. For example, a telephone number may have to be preceded by a '<' and followed by a '<' before the modem will dial the number. The manual dial and batch-mode dial commands can be used in communications software packages to dial phone numbers from directories stored on disk.

Dialing Directory. A modem dialing directory allows a user to store frequently used telephone numbers. A number can be dialed from the directory by keyboard selection of a menu number that corresponds to the telephone number. Dialing directories usually allow the user to store 20 to 60 characters with each number to describe the host system accessed by the number. Some directories are stored in nonvolatile bubble memory; alternatively, a battery backup is provided that allows the user to disconnect the modem from its power supply for several days without losing the stored numbers.

Name Selection Redialing. Modems that provide dialing directories may allow the user to select a host system to dial simply by typing the host's name. After the user enters a name from the PC keyboard, the modem searches the dialing directory and dials the associated telephone number if the name is found. This feature may also allow input of only part of the name to activate the automatic dialing of the appropriate number.

Dial Tones. Modem dialing commands usually include a selection of pulse or touch-tone dialing. The dialing signals transmitted to the telephone system are the type specified by the dialing prefix command. Some modems allow the dial type to change during the dialing sequence to match the telephone equipment in use. This feature may also include a secondary dial-tone wait command. Dial-tone wait commands cause the dialing sequence to pause until a secondary dial tone is detected.

Some intelligent modems not only wait for a secondary dial tone during a dialing sequence, but also sense and switch between touch-tone and pulse dialing to match the telephone system being used. Usually this type of modem also provides a blind dialing mode. Blind dialing allows the modem to dial when a dial tone is supposed to be present but none is detected. Some PBX telephone systems use nonstandard tones that certain modems will interpret as a dead line. Blind dialing is the only way to get around the problem.

Some PBX telephone systems use nonstandard tones that certain modems will interpret as a dead line. Blind dialing is the only way to get around the problem.

Last Number Redial. Some modems enable the user to redial the last number called by entering one number or letter at the computer keyboard. This capability can be used by a communications software package to redial a number several times without having to store the number in the computer's memory.

Repeat Dialing. Some modems can redial a telephone number a predetermined number of times. When you enter a numeral after a redial command, the modem dials repeatedly until the connection is made or until it has made the specified number of attempts.

Number Linking. Number linking enables the user to specify at least one other telephone number that should be dialed if the first number is busy or does not answer. This is an excellent feature for use with mainframe systems that have more than one access line or with bulletin board systems that are frequently busy. A number-linking feature also allows the user to establish a chain of numbers to be dialed in sequence. The last number in the sequence may often be linked back to the first number in the sequence so that a continuous polling of telephone numbers is possible. Number linking can be used to redial one number an unlimited number of times by specifying the original number dialed as the linked number. This can sometimes be used to get around the FCC requirement that an auto-dialer not repeat a dial more than 15 times. (In Canada the limit is 10.)

A number-linking feature, like an auto-dial feature, should provide an optional alarm to indicate a completed telephone connection. This feature should also permit the alarm to be disabled when it is not needed or desired.

Directory Modification. Modem dialing directories should be designed for easy modification of names and telephone numbers. A single command should be able to clear either selected entries or all directory entries. The clear-all-entries command should require confirmation. Another modem command may allow the user to list all or selected entries in the directory.

Auto-Answer. Many intelligent modems offer control of the number of telephone rings that should occur before a call is answered in an automatic answer mode. For example, the command ATS0 = 5 causes a Hayes Smartmodem to answer a call on the fifth ring. These same modems normally allow a user to force them to answer the telephone whether or not a call is coming in. Connecting two computers directly via two modems without going through the telephone system requires a forced answer. By placing a short length of telephone cable between two Smartmodems, you can connect two computers for file transfers by executing a force-to-answer (ATA) command on one modem and a force-to-dial (ATD) command on the other modem. You can also use the force-to-answer feature when a single line is used for voice and data communications and the data communications call is dialed manually on a normal telephone.

Busy Mode. The busy command provided by modems enables a user to take the phone "off the hook" for a while. This command is useful for bulletin board operators who want to use the system temporarily for other applications but want the system to appear busy to callers. The busy command can also be used on a voice line to keep calls from coming in for a period of time. Through software control the telephone could be made to appear busy for certain time periods each day.

A number-linking feature allows the user to establish a chain of numbers to be dialed in sequence. The last number in the sequence may often be linked back to the first number.

Protocol Detect and Switch. The auto-answer mode of some modems automatically detects the protocol of an incoming call and switches its own protocol to match that of the caller. Typical protocols are Bell 103, Bell 113, and Bell 212A, but some of the more expensive modems also include the Racal-Vadic protocol. The protocol switch between Bell 103/113 (300 bps) and Bell 212A or Racal-Vadic (1200 bps) also requires a data speed switch. If a modem does not provide detect and switch capabilities, these operations can usually be accomplished through software control.

Set Answerback String. Modems can be programmed to transmit a particular sequence of identification characters immediately after originating or answering a call. Typical built-in answerback registers (reserved areas of internal memory) hold between 16 and 32 characters and are used to identify the modem, terminal, or computer work station to a remote computer. The answerback string feature saves the user from keying in a password or a logon code every time a call is placed to the system.

Set Backspace Character. Some host computers require the selection of a special character to be interpreted as a backspace. The ASCII character equivalent of a Control-H (ASCII value 8) is normally the default backspace delete character, but some systems use the ASCII DEL character (ASCII value 127) as a backspace delete also. The set backspace command programs the modem to accept a character other than a Control-H as a backspace.

Set Attention Character. Modems usually have on-line and off-line operating modes. The modem is in an interactive-command mode while off line and in a "transparent" transmit and receive mode while on line. In the off-line mode, the modem will respond to commands, but after a call is made and the telephone is answered on the remote end, the modem automatically switches to the on-line mode. In the on-line mode, the modem will not recognize modem commands.

To get the modem to go off line so that it will respond to keyboard commands, several "attention" characters must be sent to the modem. The modem usually comes with a default attention character (for example, the '+' is the default attention character for the Hayes Smartmodem), but that character can be redefined. This feature is useful for bulletin board software developers because it allows them to have the attention character redefined before each caller enters the system. Without a redefinition of the attention character, system saboteurs could cause the bulletin board to "lock up" by issuing the modem attention command during a communication session.

Set Disconnect Character. Some modems allow a user to specify a special character string that will cause the modem to sever the connection and drop the carrier signal (go "on hook") when a call is completed. The carrier signal is the unaltered signal that is constantly transmitted and received whenever a modem connection is established between two computer devices. When information is transmitted, it alters the carrier. This signal encoding is sometimes described as having the information superimposed, or "riding," on the carrier signal.

The character string usually consists of two or more characters that must be sent to the modem sequentially from the local terminal. Characters received from the remote terminal or computer will not produce the same results. This is a useful capability when the modem is used to call a host system that leaves the carrier connected long after a log-off command has been received. The carrier signal must be dropped and the local modem returned to an "on hook" status before the local system can make another call.

Modem Register Contents. Communications software packages must sometimes query the contents of a modem's internal memory registers to detect and modify the contents of the registers or to detect those changes in register contents that act as signals to initiate software functions. A modem should provide commands that allow a software package to both query and modify the contents of its registers. This is particularly useful in bulletin board software design because such parameters as the speed (bps), parity, and number of data bits must be detected when the modem answers an incoming call.

Modem Switches. Some communications software packages require that special signals be either present or absent between the computer and a modem for the program to function properly. For example, *PC-Talk III* requires that switch 1 (Data Terminal Ready) on the stand-alone Hayes Smartmodem be in the down position for communications parameters to be changed while on line with a host system. If switch 1 is up, the carrier and the connection with the remote computer are lost during the parameter change. Modems must allow these signals to be set through either software control or manual switch control. The ideal design would allow manual and software changes.

Built-In Self-Tests. Built-in self-test features allow a modem to be tested as a stand-alone device or in conjunction with a similarly equipped remote modem. The tests verify the modem's ability to send and receive data accurately. The three types of test modes are the analog loop-back self-test, the digital loop-back self-test, and the remote digital loop self-test.

The analog loop-back self-test verifies the operation of a local modem as a stand-alone unit. Data is sent from the self-test circuit through the modem's transmitter. The transmitter output is routed back into the modem's receiver, which then routes the data back to the self-test circuit. The self-test circuit compares transmitted patterns to received patterns and signals whether there are any errors.

The digital loop-back self-test verifies the operation of a remote modem. With the help of the remote modem operator (to change switch positions on the remote modem), data is sent from the local modem and looped through the receiver and the transmitter of the remote modem. When the data is received back at the local modem, it is compared with the original transmitted data. If errors are detected, the modem notifies the local user. The remote digital loop self-test is identical to the digital loop-back self-test except that it can be performed without remote operator assistance.

A board-mounted modem is a logical choice for the owner of an IBM PC-compatible portable who wants to minimize the number of gadgets to be carried along.

Stand-Alone or Board-Mounted. Many modem vendors have introduced new modems designed to be installed in a PC expansion slot. Although they perform essentially the same functions, the stand-alone model and the expansion board design each has specific advantages and disadvantages.

A board-mounted modem is a logical choice for the owner of an IBM PC-compatible portable who wants to minimize the number of gadgets to be carried along with the computer. People who own a PC XT or a PC with an expansion chassis might also select a board-mounted modem, since those computers have additional expansion slots available and larger heat-removal capacity than the PC. People who want a complete communications hardware package that requires no external cables, boxes, and power supplies might also want a board-mounted modem.

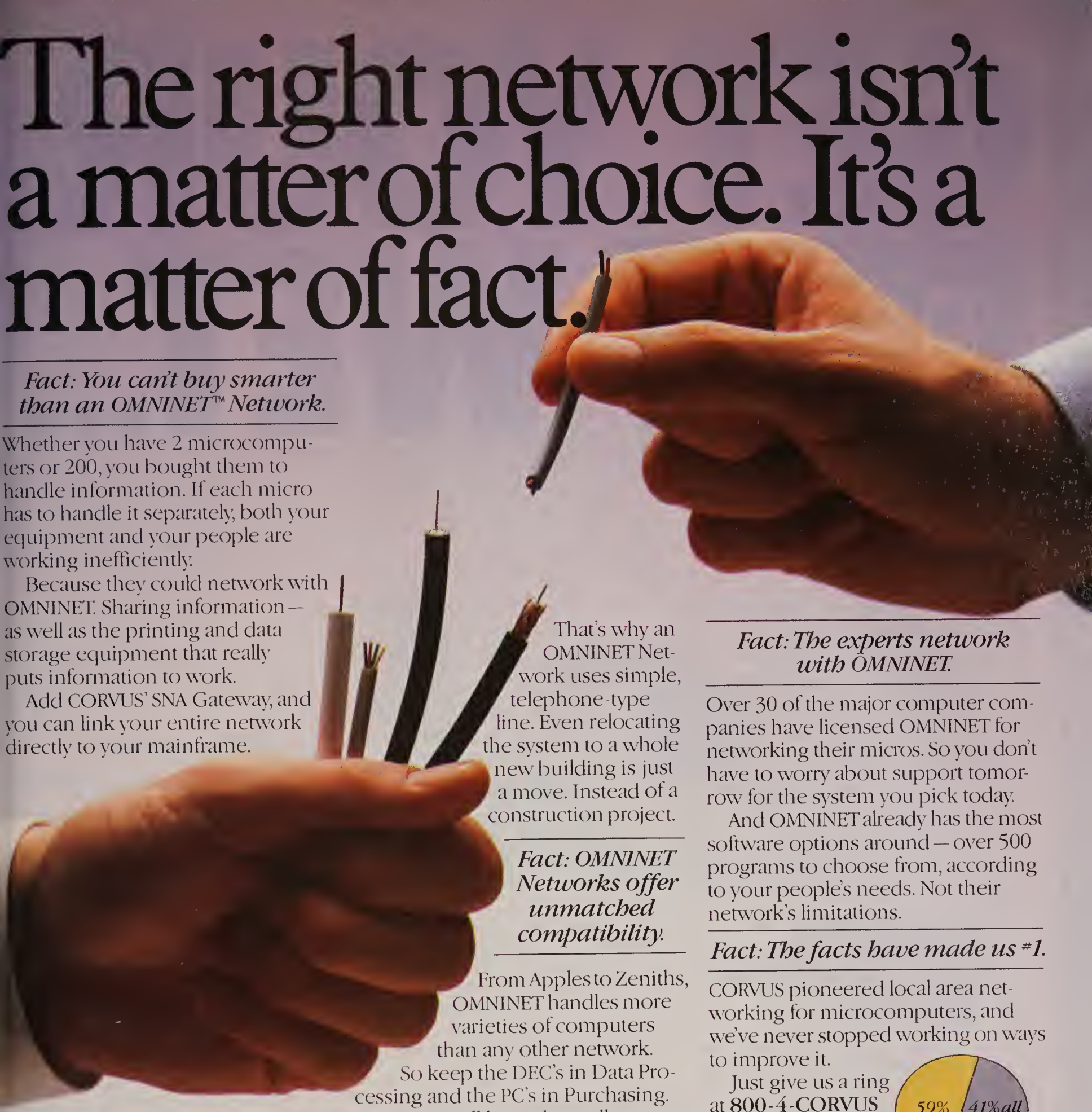
Board-mounted modems must have some method to communicate dialing information to the PC user, such as the number being dialed, whether dialing has been completed, and whether a connection has been made to a remote system. Some board modems use either the PC speaker or one located on the modem board to help the user understand what is taking place after a call has been initiated. The user can hear the telephone dialing and the results of the call. Other modems use screen messages to indicate the status of a call.

A stand-alone modem is a good choice for people who use several computers and terminals, all of which require a modem for communication with other devices. This type of modem is easily moved from one device to another. A stand-alone modem is also a good choice for communications software developers and bulletin board operators.

Stand-alone or board-mounted, a modem can open up the world of computer communications. Despite the extensive range of features described here, most modems are designed to run transparently; that is, the end user probably won't spend much time or effort controlling or operating the modem.

Larry Jordan is a freelance writer who manages power plant start-up engineers for the NUS Corporation. He coauthored the book Communications and Networking for the IBM PC, *published by The Brady Company (Bowie, Maryland, 1983).*

The right network isn't a matter of choice. It's a matter of fact.



Fact: You can't buy smarter than an OMNINET™ Network.

Whether you have 2 microcomputers or 200, you bought them to handle information. If each micro has to handle it separately, both your equipment and your people are working inefficiently.

Because they could network with OMNINET. Sharing information — as well as the printing and data storage equipment that really puts information to work.

Add CORVUS' SNA Gateway, and you can link your entire network directly to your mainframe.

That's why an OMNINET Network uses simple, telephone-type line. Even relocating the system to a whole new building is just a move. Instead of a construction project.

Fact: OMNINET Networks offer unmatched compatibility.

From Apples to Zeniths, OMNINET handles more varieties of computers than any other network.

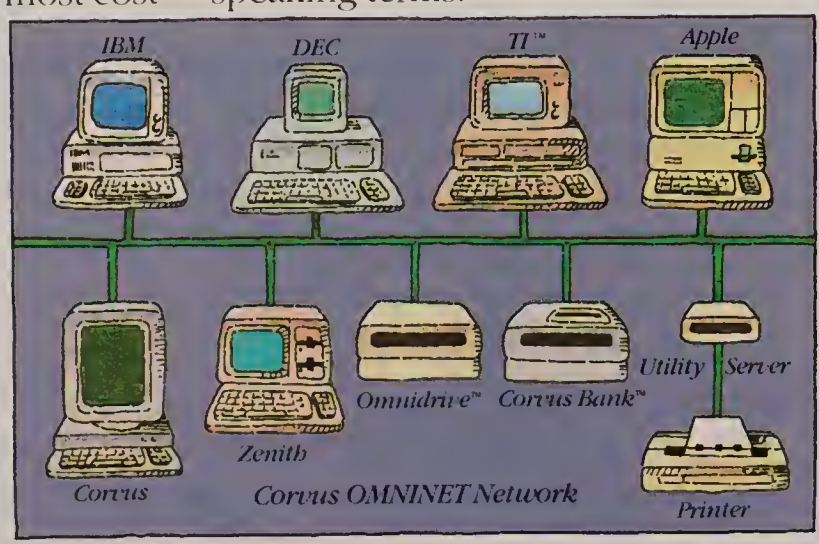
So keep the DEC's in Data Processing and the PC's in Purchasing. OMNINET will keep them all on speaking terms.

The price? At under $500 per hookup, OMNINET is the most cost-effective network you can install. Or expand.

Fact: This network was designed for microcomputers.

Micros get moved. Businesses expand.

Your network should be able to grow and change just as fast as your business does.



Fact: The experts network with OMNINET.

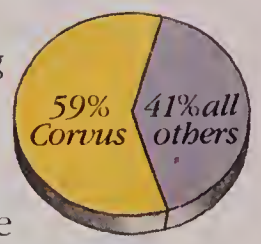
Over 30 of the major computer companies have licensed OMNINET for networking their micros. So you don't have to worry about support tomorrow for the system you pick today.

And OMNINET already has the most software options around — over 500 programs to choose from, according to your people's needs. Not their network's limitations.

Fact: The facts have made us #1.

CORVUS pioneered local area networking for microcomputers, and we've never stopped working on ways to improve it.

Just give us a ring at **800-4-CORVUS** to find out more.



Because while calling ourselves the best is a matter of opinion, telling you that 3 out of every 5 locally networked micros work on a CORVUS network is something else.*

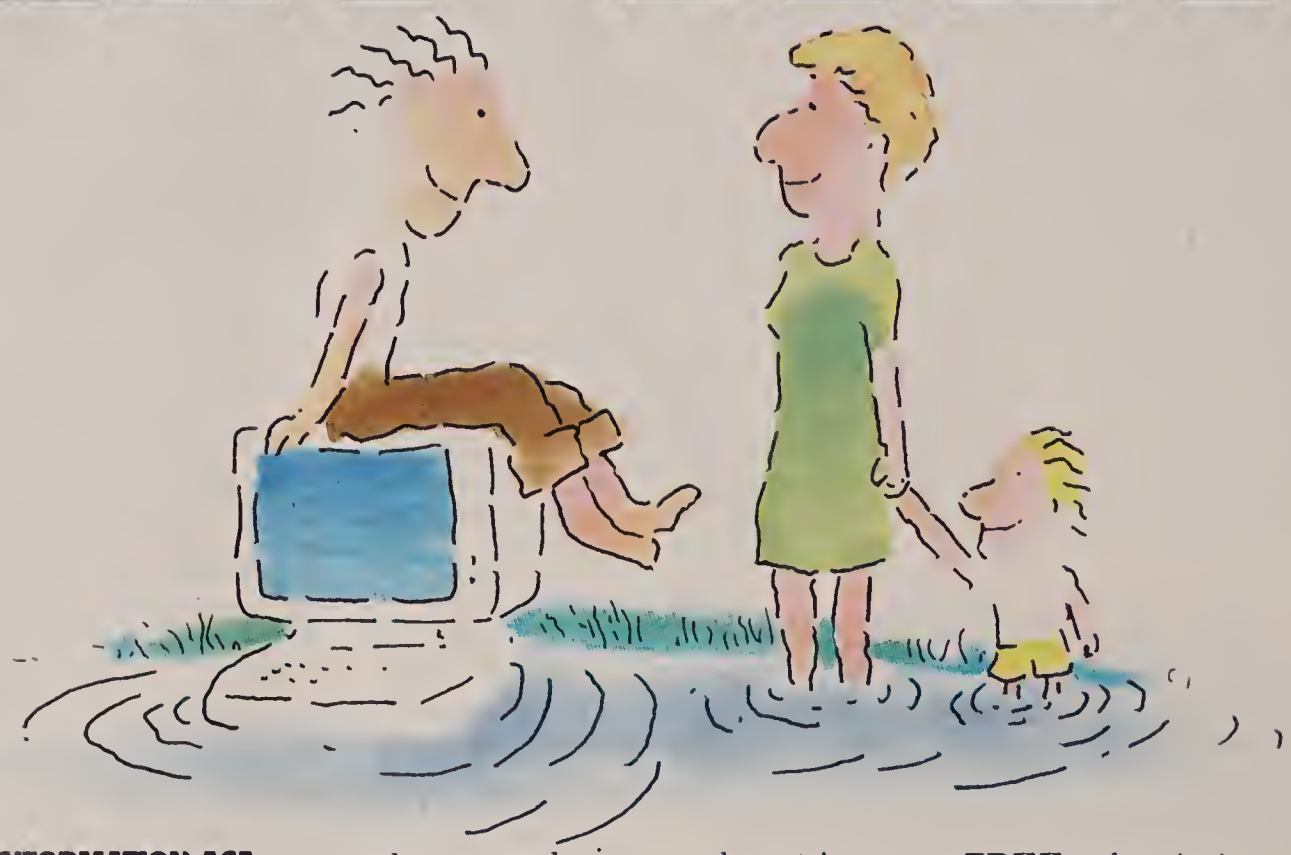
It's a matter of fact.

CORVUS
The Networking Company.

*59% of all locally-networked micros operate in a CORVUS network, according to *InfoCorp.* CORVUS, THE NETWORKING COMPANY, OMNINET, OMNIDRIVE and CORVUS BANK are trademarks of CORVUS SYSTEMS, INC. IBM PC is a trademark of International Business Machines. APPLE is a trademark of APPLE COMPUTER INC. DEC is a trademark of DIGITAL EQUIPMENT CORPORATION. Zenith is a trademark of Zenith Corporation.

Circle 49 on reader service card

GET YOUR FEET WET...



...IN THE INFORMATION AGE WITH THE DOW JONES NEWS/RETRIEVAL® MEMBERSHIP KIT. SAMPLE A CONTINUOUS STREAM OF KNOWLEDGE AT A PRICE YOU CAN AFFORD.

Now you and your whole family can experience the information age without getting in over your head.

For just $29.95, the new Dow Jones News/Retrieval Membership Kit leads you step-by-step into entertaining and informative data bases. With **five free hours** to sample and explore, you can find a fact, shop at home, get the scores, plan a trip, review a movie, choose a stock, or check world and business news. There's a lot more, too. All you need to get started is a computer and modem:

The Membership Kit is a big value that entitles you to:

- FREE password ($75 value)
- Easy, step-by-step User's Guide
- FIVE FREE HOURS of unrestricted usage to explore the magic of this comprehensive service
- FREE subscription to *Dowline*, the magazine of Dow Jones News/Retrieval
- A special introductory offer!

Get your feet wet in the information age with the Dow Jones News/Retrieval Membership Kit. At $29.95, you'll enjoy the dip without getting soaked. Available at your local computer retailer, or call Dow Jones at:

1-800-257-5114
In New Jersey, Canada, Hawaii and Alaska
1-609-452-1511

"Toss away any preconception that Dow Jones News/Retrieval is a stuffy, one dimensional data base service designed only for an elite corps of stock analysts and Wall Street wizards. Far from it—Dow Jones News/Retrieval also provides entertaining movie reviews, current weather and sports reports, convenient electronic shopping and inexpensive electronic mail. . .Dow Jones News/Retrieval is informative, entertaining and well worth the money."
-**Brad Baldwin,** *InfoWorld* Magazine

DOW JONES NEWS/RETRIEVAL®

Copyright © 1984 Dow Jones and Company, Inc. All Rights Reserved. Dow Jones News/Retrieval® is a registered trademark of Dow Jones and Company, Inc.

Circle 176 on reader service card

The Communicators

Telecommunications can broaden your horizons and connect your computer to the outside world. A look at the most important features of communications programs will help you select the package that's right for you.

Larry Jordan

When my IBM PC was delivered in February 1982, I selected a communications software package easily. The only two available were COMM.BAS, which came on the PC-DOS disk, and the *IBM Asynchronous Communications Support* package. I did not know much about personal computer communications at the time, but the thought of being able to operate the office mainframe from my house intrigued me. Without knowing what I was getting into, I immediately purchased the *IBM Asynchronous Communications Support* package, a Hayes Smartmodem, and an asynchronous communications board. After putting all the pieces together and making several awkward attempts to communicate with the office Prime computer, I really started rolling. I could use my modem to converse with the Prime, and the modem would dutifully follow my every whim. I could also churn out hundreds of lines of FORTRAN without going anywhere except to the refrigerator for a soda. I felt I had all I would ever need for communications.

Then I discovered electronic bulletin boards. The first time I called a local bulletin board I learned that my communications software was not quite as capable as I had thought. There were software patches (a fancy word for software enhancements or error corrections) and games available on the board, but I had no way of capturing the program listings as they scrolled by on my monitor.

By talking with friends I learned that I needed software that would transform my IBM PC into a smart terminal with the ability to send and receive disk files. The *IBM Asynchronous Communications Support* package was supposed to provide that capability, but it had many limitations. After several futile attempts at modifying the IBM package, I gave up and started adding enhancements to the COMM.BAS program. At about that time I received my first copy of a communications package called *PC-Talk*. Not only did this package give me the smart-terminal capabilities I needed, but it also included excellent documentation and easy-to-follow source code.

Since those early days of PC communications, many powerful smart-terminal communications programs have been released for the PC. Some were initially designed for CP/M-based computers

and have been converted to operate under PC-DOS; other new packages have been written specifically for the IBM PC. Due to the large number of communications programs currently available, it is more difficult than ever to choose.

As with any software package, no single communications program is likely to satisfy all wants and needs. The best one can hope for is to find a package that provides most of the essential features and some additional nonessential but desirable features.

Although business and personal applications of communications software are often different, some common capabilities are required by both. Business and personal applications usually require sending and receiving disk files and communicating in terminal or conversation mode. Many business applications require sending longer files than would normally be sent in personal telecommunications. The remainder of this article discusses the common capabilities to look for in these two types of software.

Basic Communications Features

Data capture. Data capture, also called downloading, is the process of storing received data in memory or in a disk file. Some packages capture data directly to a disk file, whereas others capture data to a buffer in RAM for later storage in a disk file. Some packages also enable you to display and edit the contents of a memory buffer without terminating the communications link.

Xmodem protocol file transfer. The Xmodem protocol performs 99.6 percent error-free error detection on transferred blocks of data and automatically retransmits erroneous blocks. Xmodem is desirable when you are sending files in which the change of a single number may be critical, or when sending 8-bit program files. Although Xmodem is the most widely used error-checking scheme, other protocols, such as Columbia University's Kermit and Microcom's Microcom Networking Protocol, are gaining ground. Keep in mind that both the transmitting and the receiving computers must use the same protocol.

XON/XOFF handshaking. During telecommunications at rates greater than 300 bits per second (bps), speeds become less precise, and the receiving buffer may fill up too fast. When the buffer begins to fill up, the software tells the transmitting computer to stop sending data by issuing an XOFF character. When the buffer is emptied, the software signals the host to resume sending data by issuing an XON character.

Manual- and auto-dial modem support. Communications software that supports only manual-dial or auto-dial modems limits flexibility. It may be a good idea to get a package that supports both.

Auto-dial telephone directory. A package should allow you to list a directory of available telephone numbers. Numbers that are buried in command or batch files are often inconvenient to locate.

Automatic dialing. Information services and bulletin boards are frequently busy. Most communications packages can automatically redial the last number dialed. However, some packages can also redial a number until a connection is made. In some cases the software provides an alarm signal when the connection is finally established. Another option for automatic dialing allows you to set up a dialing sequence on your directory. You can instruct the modem to call one number after another until a connection is established.

Modem/telephone hang-up. Some remote systems do not automatically break the telephone connection when you log off. There should be a software command available that "drops the line" when an auto-dial/auto-answer modem is being used. Without this option the modem might have to be turned off to break the connection; frequent use of the power switch in this manner may shorten the life of the modem.

Return to operating system. Communications software should not require you to reboot the computer each time a communications session is completed. Many packages use a function key or an <Alt> key combination to return

By talking with friends I learned that I needed software that would transform my IBM PC into a smart terminal with the ability to send and receive disk files.

to the operating system, while others require you to pass through a series of menus before arriving at the operating system. Another useful option is the ability to return to the operating system without breaking the communications link.

Elapsed time of call display. Information services generally charge a rate based on connect time. An indicator of the connect time (time elapsed) can help you monitor costs.

On-line switch between originate/answer. To receive a call from a remote computer, the modem must be switched from the originate mode to the answer mode. Manual- and auto-dial modems have a switch that activates the mode change, but most auto-dial modems can also be switched easily through software control.

On-line duplex toggle. A communications package should provide a way to switch between half-duplex (one way at a time) and full-duplex (bidirectional) communication modes (see Figure 1). Most information services and bulletin board systems operate in full-duplex mode, but other systems may operate in half-duplex mode. When operating in half-duplex mode, either the program or the modem must display outgoing data on your screen. This feature is called local copy (see Figure 2).

On-line selection and listing of communications parameters. You must be able to match the parameters of your system with those of the remote system. These parameters include data transmission speed in bps, parity type, number

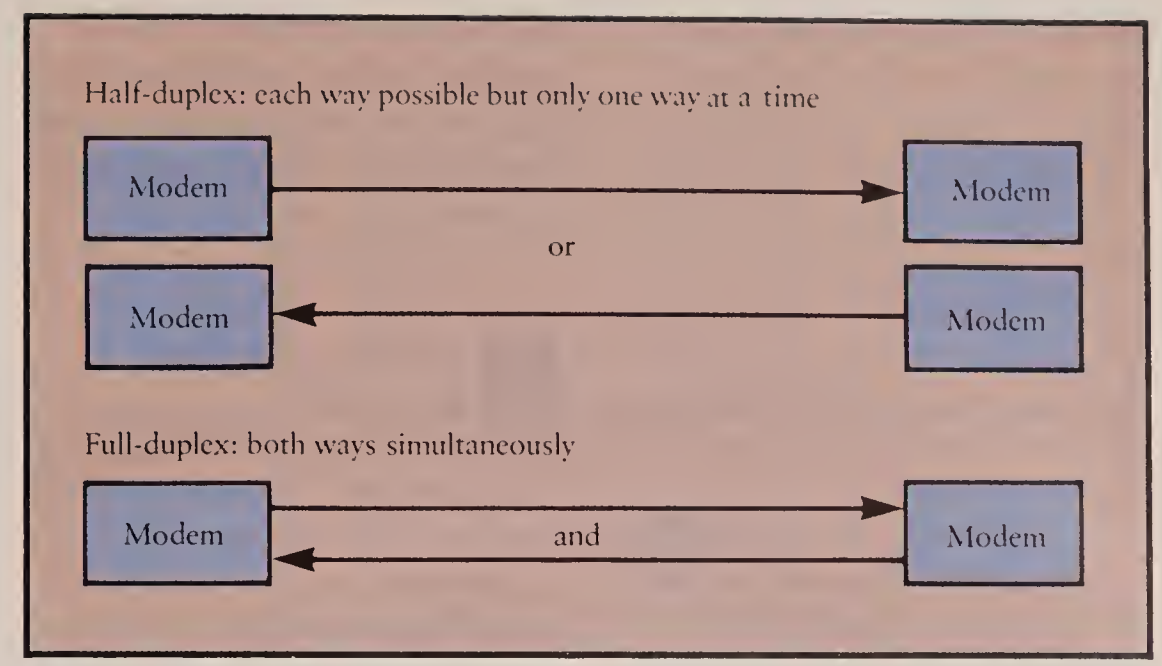


Figure 1: Data communications modes

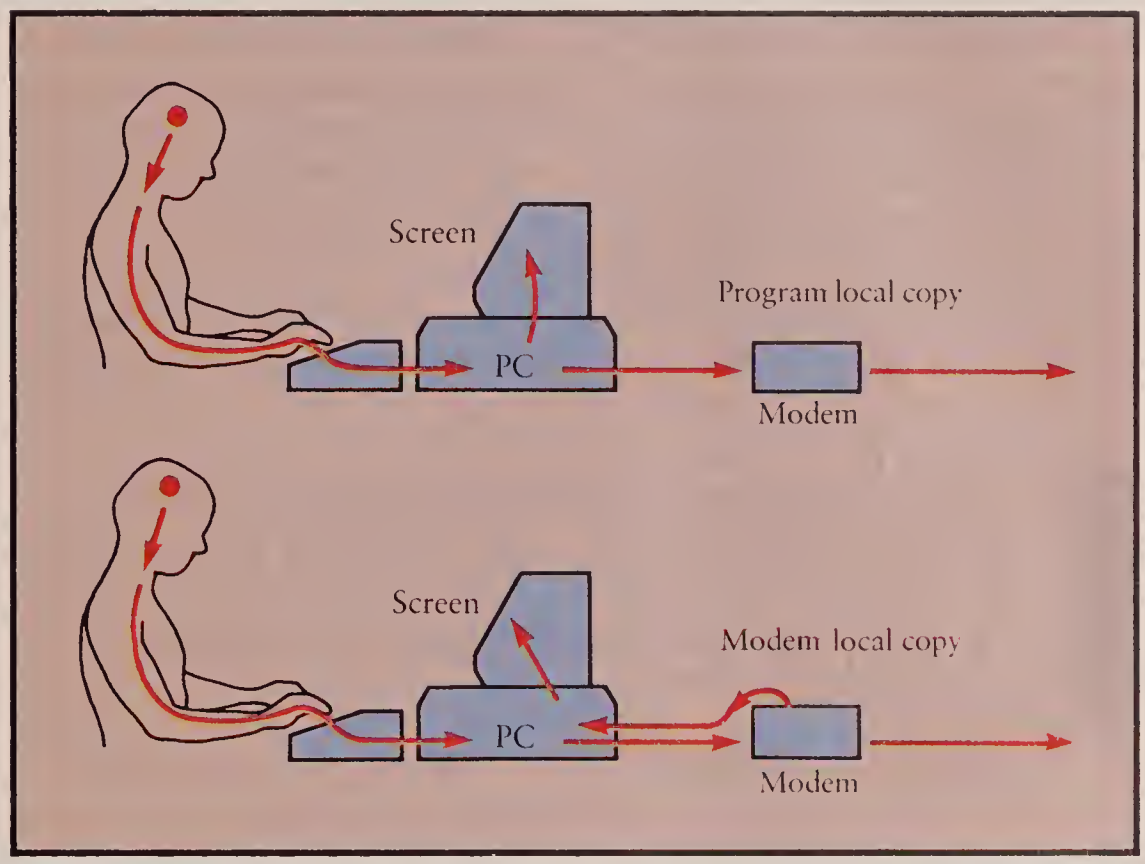


Figure 2: Program local copy versus modem local copy

of data bits, and number of stop bits (see Figure 3). The communications software usually provides default values for these parameters, but it should also allow you to modify the default values both before and during a telecommunications session. An on-screen dialing directory should list the established parameters for each phone number.

On-line printer on/off toggle. Some packages enable you to display and print out data simultaneously as it is received over the phone line. A single key that toggles the print function on and off without interrupting the data transfer allows you to print portions of the text selectively.

On-line viewing of disk directories and files. During a communications session it is helpful to list the directories of all disk drives so you can easily select files for transfer or make sure that the file name for received text is not currently in use. Some programs also enable you to view a menu of parameter files or batch files and to enter and view the file itself. Some software also allows you to delete and rename disk files while connected to a remote computer.

Command file support. If you call the same computer system frequently, you can use command files to store logon information—such as the name, phone number, and transmission rate—for that system on disk. When loaded, these files perform the commands automatically, as if you had entered them from the keyboard.

Many communications packages enable you to store logon strings in macros, which can later be uploaded with one or two keystrokes.

Advanced Business Features

Filtering of control characters. Some computers transmit control characters that can be confusing or disruptive when displayed as part of the received data. The program should enable you to use a command string to filter these characters out.

Blank-line expansion. When you are uploading (sending) files to a mainframe host editor, the mainframe editor often misinterprets lines that contain only carriage returns as a request to change from input to edit mode. When this happens the transmission is terminated. The blank-line expansion feature automatically pads blank lines by inserting a blank space before the carriage return, thereby avoiding this problem.

Linefeed editing. Linefeeds are the control characters that tell the screen (and ultimately the printer) when to begin a new line. Some communications packages add linefeeds after each received or transmitted carriage return, but others do not. When a package does not allow you to control linefeeds, each line may either print over the previous line, making the text impossible to read, or else produce extra blank lines. These files must then be edited to remove or add linefeeds.

Upload text throttle. To match the file transfer rate of a PC with the system response of a mainframe, it is sometimes necessary to throttle, or pace, the transfer rate. You can throttle the transmission using time delays, character-receipt delays, and character-prompt delays. A time-delay throttle allows you to control the length of the time between the transmission of each line. A character-receipt delay enables you to specify the number of characters that must be received before the next line of data is sent. A character-prompt delay allows you to define the character string that must be received before another line of data is sent.

Prestored uploadable strings. Frequent communications with systems that require extensive logon procedures can mean a great deal of repetitive typing. Many communications packages enable you to store logon strings in macros, which can later be uploaded with one or two keystrokes. Some software displays a list of these strings while you are logged on to another system.

True break signal. Many mainframes and some information services require a break signal in order to interrupt a program's execution. The ability to send an attention-getting 200- to 600-millisecond, high-frequency signal can be a useful feature.

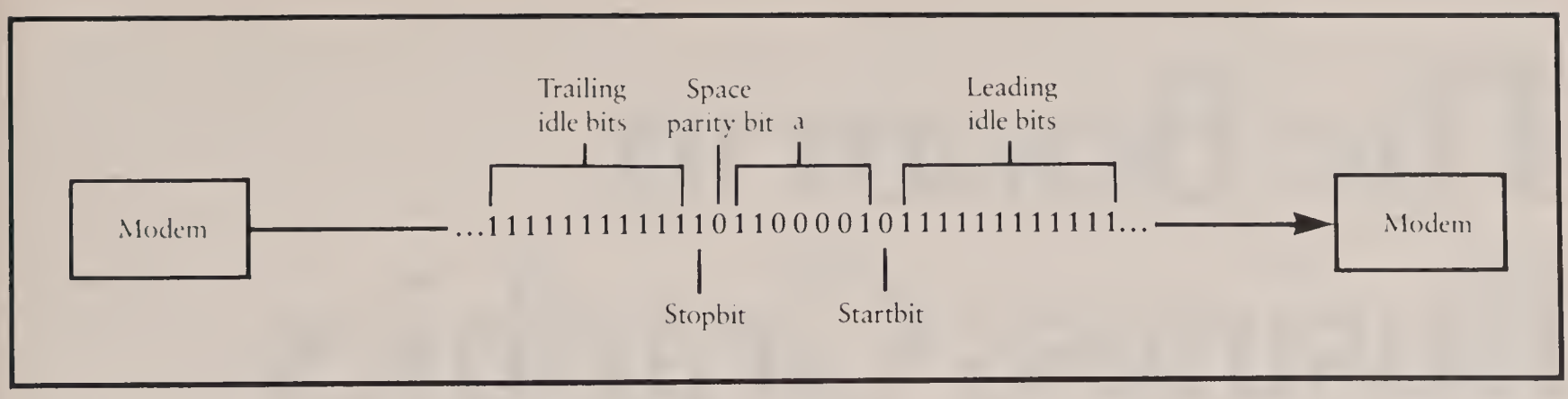


Figure 3: Configuration of bitstream for binary "a"

Tab-to-space conversion. Some programs save valuable disk space by representing up to eight spaces with a single tab character. Other systems, however, do not follow the same convention, so you may want to convert tab characters back to spaces. Some packages allow you to turn this automatic conversion on and off.

Batch operation from operating system. Batch mode operation is similar to command file execution, but it supports several commands not supported by command files. A batch file can modify communications parameters and dial a telephone number, but unlike a command file, it can also continue the communications session after a connection is established. Logon messages can be sent and files transferred without operator assistance. A batch file can also be programmed to execute at a time when telephone costs are low.

Remote takeover and operation. Some communications packages allow users to call in from a remote computer and control the main computer as if they were sitting in front of it. To perform this function both systems must be using the same communications software.

Terminal emulation. As PC-to-mainframe communication increases, many packages are offering the ability to imitate dumb terminals for specific mainframes. Without the correct terminal emulation modes, the mainframe may not accept your connection, and communication may be difficult or impossible.

Split-screen option. The ability to split the screen enables you to separate the messages you type from the messages you receive during chat mode (real-time keyboard communications). When you split the screen, your input appears on one side of the screen, and received messages appear on the other.

Ease of command key use. Communications software should be operable in a command (off-line) or a conversation (on-line) mode. You should be able to switch easily between the two modes.

Help and Documentation

Display of help files. On-screen help files are not a replacement for a good user manual, but they provide a quick reference for the keys required to perform certain functions. These help files should be readily accessible and written in clear, concise English. In addition, some programs offer a "status line" (usually line 25), which provides help specific to the current task at all times.

User manual. A communications package is incomplete without a good user manual. A package that contains all the features described above is of little use without a manual that clearly describes the use of each feature. A communications primer, while not a necessity, can prove invaluable to beginning users.

Larry Jordan is a freelance writer and consultant for NUS Corporation. He coauthored the book Communications and Networking for the IBM PC, *published by The Robert J. Brady Company (Bowie, Maryland, 1983).*

The Boom in Business Graphics

"Let us in no way minimize the opportunity, or the danger, involved. The 30 minutes an executive spends on his feet formally presenting his latest project to corporate superiors are simply and absolutely the most important 30 minutes of that or any other managerial season."—Walter Kiechel III, Fortune magazine

David L. Wilcox

The importance of business presentations led to the production of more than 557 million slides for those events in 1983, more than twice as many as in 1978. In 1983 computers generated 16 million of those slides, up from only 300,000 in 1978 (Hope Reports, Inc., Rochester, New York). The pattern is clear: businesspeople are discovering that graphics are a quick and efficient way to communicate. The written word is often the only effective way to relate complex information, but reading or listening to words is a slow process. The mind is capable of grasping information much faster than the average person can speak. What's more, the mind retains a visual representation of data with greater accuracy and for a longer period of time than it does a written equivalent. Try an experiment on yourself. Read the paragraph in Figure 1. How long does it take you to comprehend the significance of the data? Now look at Figure 2, a graphic representation of the same data; instantly the trend is clear.

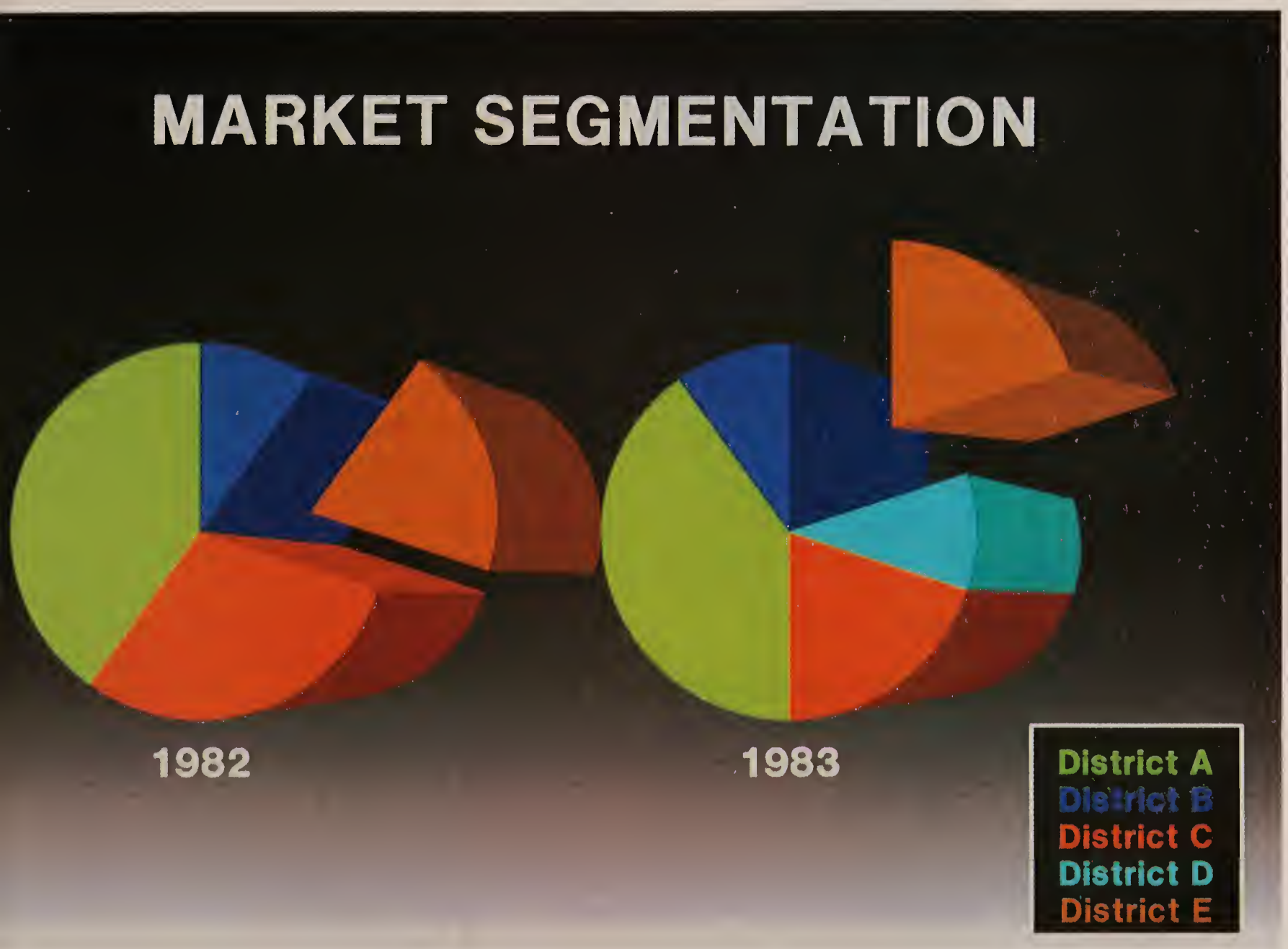
With reams of computer printouts full of data to present, today's business professional is crippled without the use of conceptual shortcuts. But many professionals who would benefit from computer graphics don't take advantage of them, finding the field confusing, riddled as it is with jargon like *resolution, pixels,* and *raster scan.* For someone who needs to evaluate microcomputer-based graphics for his or her organization, the best approach is to read the literature and learn the jargon. However, the technology barrier can be sidestepped by finding the answers to some basic questions.

Why Use Graphics?

Computer graphics can be used in a variety of ways, from artistic expression to computer-aided design and manufacturing. However, the dominant use of computer graphics is for representing data in a readily understandable visual format. Data representation can be used for a wide spectrum of applications. For example, stock analysts and brokers can use computer graphics to view changes in stock price and volume charts from a central data base, and a soft drink company can use them to present sales and advertising plans for a new soda to its bottlers (see Figure 3).

Exploded pie charts. By dissecting and exploding pieces of the visual pie, you can focus the viewer's attention on the point you want to make.

Created using Graphwriter. Source: Frost and Sullivan, Inc.



Compuco's After Tax Operating Income was between $235 and $300 million in the first 2 quarters of 1981 prior to the acquisition of Flodata. Since then quarterly income from Compuco's traditional business has declined steadily to a level just over $100 million in the 3rd quarter of 1982. With quarterly income ranging between $140 and $240 million, Flodata has more than doubled Compuco's After Tax Operating Income during the first three quarters of 1982.

Figure 1: Text chart. Compare the time it takes to read and understand this paragraph with the time it takes to comprehend the message in Figure 2.

Created using Graphwriter

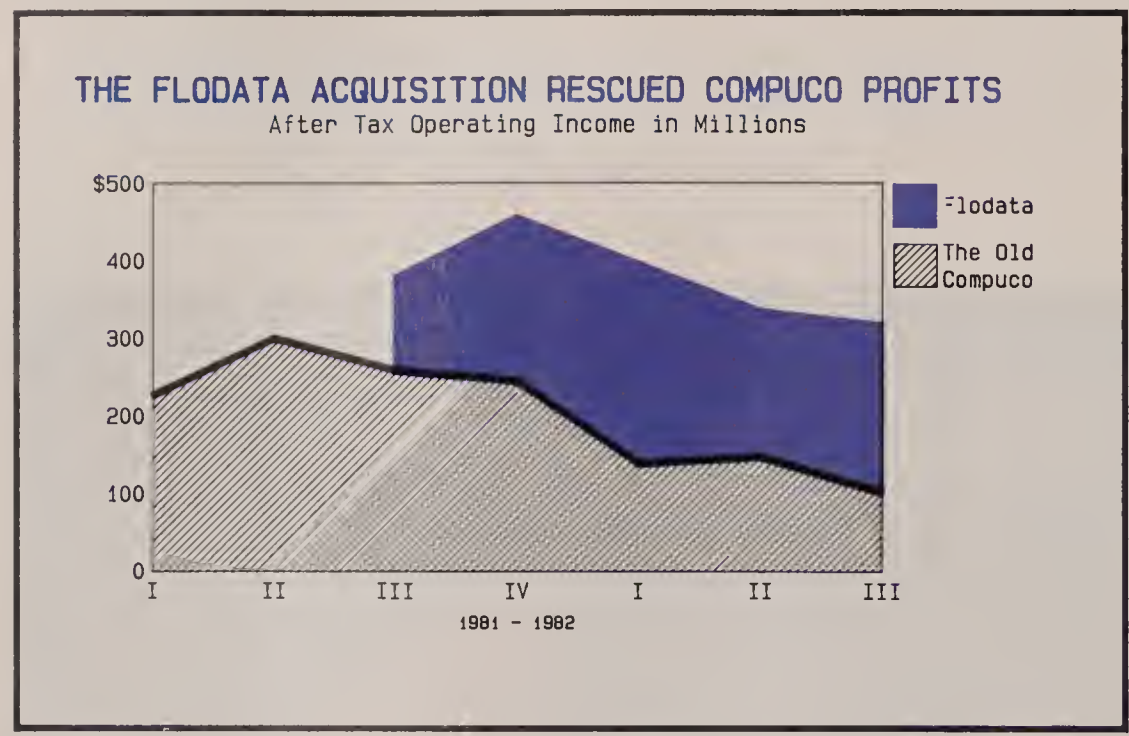


Figure 2: Multiple area graph. The message is the same as in Figure 1, but the trend can be comprehended in a fraction of the time.

Created using Graphwriter

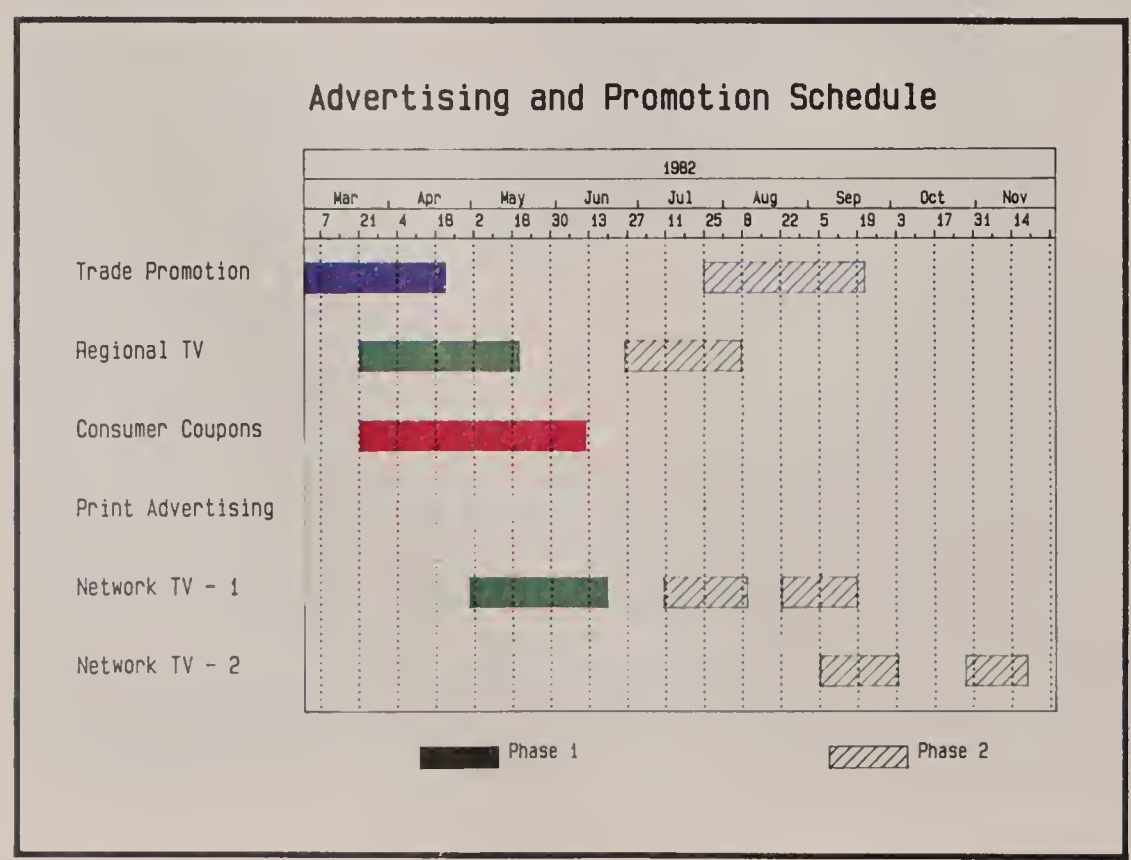


Figure 3: Gantt chart. Gantt charts are used for scheduling multiple activities over time.

Created using Graphwriter

The verbs used in these two examples–*view* in the first and *present* in the second–indicate two fundamentally different requirements for data representation. In the case of the brokerage house, the objective is to use computer graphics as a window into large volumes of data, as an aid to the viewer in extracting information. Due to the widespread use of spreadsheets and data base management applications, this type of graphics–analytical–is generally the most prevalent kind of graphics application for PC users.

The soft drink company, on the other hand, is using presentation graphics to communicate a series of messages to an audience. Although often classified together, analytical graphics and presentation graphics place different demands on a graphics system. Understanding those demands and the extent to which PCs in your organization will be used to do each kind of application is a good starting point for evaluating graphics hardware and software.

What Graphics Are Needed?

Since the news media has long recognized the value of graphics, most of us are familiar with bar charts, pie charts, and line charts. These three types compose a core group of graphs that will suffice for most analysis applications. The ability to create these chart types can be linked directly to a data base management system (DBMS) or to a spreadsheet in an integrated package such as *1-2-3*, and the wave of integration currently sweeping the software business will result in the addition of basic analysis graphics capabilities to most spreadsheet and DBMS packages.

In contrast, business graphics prepared for presentation use a wider range of graph types. While a single pie chart may be adequate for analysis, presentation of that analysis often requires multiple pies with proportional sizing, slices that are highlighted or "exploded," and the ability to rotate graphics to a desired position. Some graphics programs enable you to present charts in a three-dimensional format. These customizing features are the domain of presentation, not analysis, graphics software.

Figure 4 identifies the chart types most common in a presentation environment. The two most frequently used chart types–line and vertical bar graphs–are predominantly used to show data over time. Non-time-oriented data (such as that shown in Figure 4) is most frequently shown by horizontal bars.

The verbs view *and* present *indicate two fundamentally different requirements for data representation.*

Note that several nonanalytical formats, such as organization charts and Gantt scheduling charts (for example, the chart in Figure 3) appear lower on the list in Figure 4. Although they are not as commonly used as other formats, they are unique and have no substitute; many presentations cannot be prepared without them.

Figure 4 does not include the most frequently used format–the text or word chart. The intensive use of text in presentations is a factor often overlooked in selecting a computer graphics system for presentations. Many presentations would also benefit from the use of a freehand drawing capability. Although this area is not easily converted to a computerized application, some freehand graphics programs like those developed for Apple Computer's Lisa and Macintosh are becoming available for the PC and will be added to business graphics products in the near future.

How Do I Select a Graphics Package?

Defining the audience for your graphics is probably the most important step in deciding which system to choose and how much money you should spend. Failure to address this question thoroughly can invalidate your investment. First decide whether you need analysis graphics, presentation graphics, or both. Then identify those systems that offer the necessary charting and text capabilities.

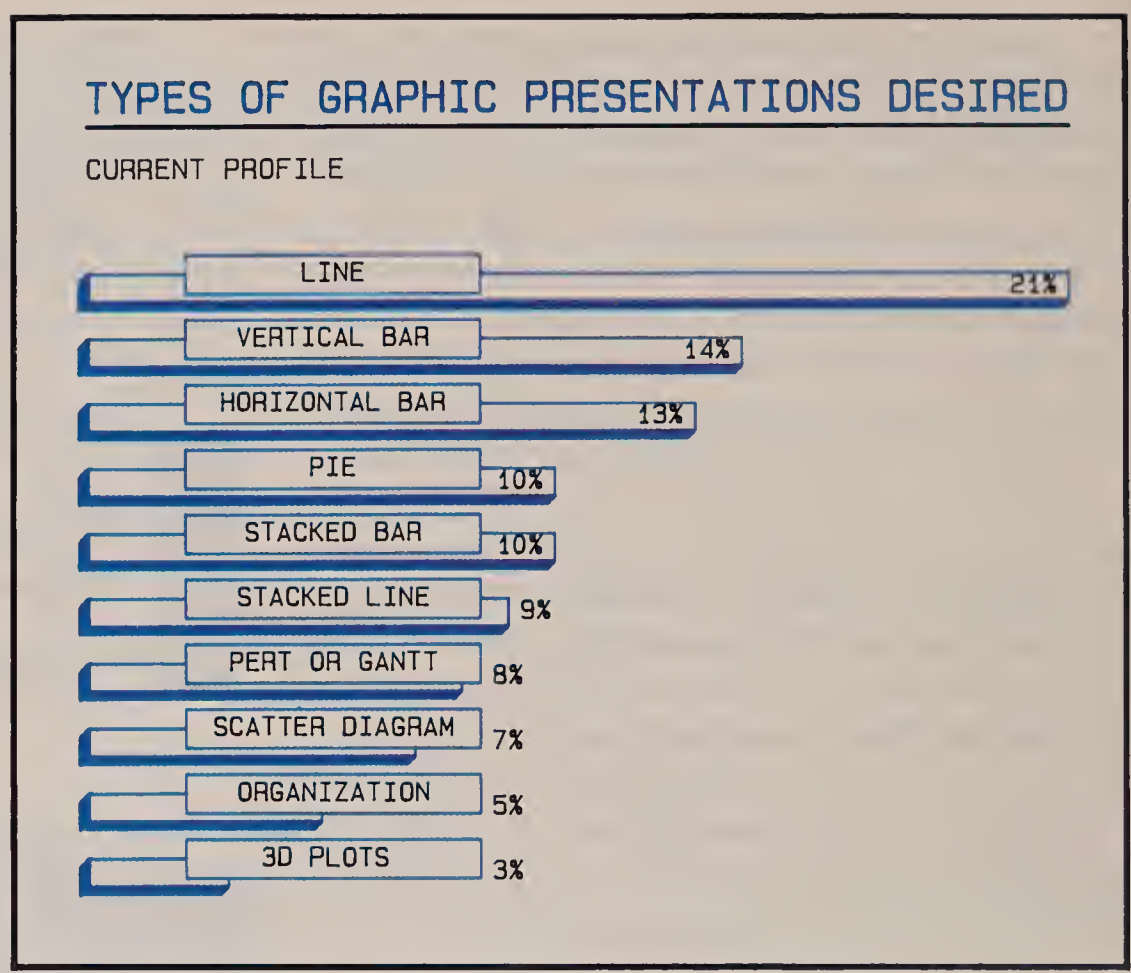


Figure 4: Horizontal bar chart. Line, bar, and pie charts make up the majority of graph types used in presentations.

Created using Genigraphics Series 1000

You should also consider who will be using the system. If you have only yourself to consider, the process is easy—buy what you want. In the typical office, however, presentations are prepared by a subordinate for review by the author and his or her peers and superiors. If there will be more than one user, you should show samples from various graphics systems to key users. Even if you make the final purchasing decision alone, employees and co-workers can offer valuable opinions and point out problems you might have missed. Show screen displays and hard copy output to those who will use the system for analysis graphics and show hard copy output and color slides to those who will frequently give presentations.

For analytical graphics the ability to import data from other application programs is key.

In addition to securing the endorsements of users, make sure the packages you are evaluating offer the necessary output options. Output options include slides, transparencies, paper (hard copy), horizontal and vertical plots, oversize output, multiple charts per page, integrated text and graphics, and color. Most systems do not create all of those charts equally well, and some not at all, so a list of your priorities is helpful.

To encourage everyone in your organization to use a graphics program, you will probably want to buy software with a menu-driven approach and on-screen help. Creating a simple graph should not require the use of a manual. A couple of products on the market provide fill-in-the-blanks input forms that can be used to guide an operator through the production of a chart.

Editing, storing, and retrieving charts should be simple, and the program should be flexible. You should be able to move quickly to any graphic or text element and make changes. If all data entry must be completed before a change can be made, the time needed for corrections increases dramatically, and so does the probability of error.

One irritating problem with most graphics software is the limited number of characters allowed for text and legends. The presenter should not be forced to use abbreviations that need to be explained verbally. Each chart should include sufficient information to stand on its own.

When refining or updating a graph, you will frequently need to make changes in the size, the color, and the location of the text. While analytical systems typically offer little or no flexibility in these respects, these customization features are becoming more common on presentation systems. The most sophisticated systems on the market today can automatically adjust the layout of the text and graph areas. The ability to preview the graph on screen is another important feature, and the ability to produce a fast hard-copy proof is useful, especially if an author is not producing his or her own charts.

Documentation for a graphics package should include a catalog of available charts. System capabilities should be communicated by pictures, not prose. If your graphics package does not include a chart book, make one and give copies to every presenter. All the system's users should understand what the system can and cannot do before a presentation is prepared.

Where Will the Data Come From?

For analytical graphics the ability to import data from other application programs is key. Select an integrated program or one that can accept data from the spreadsheet or data base that you are currently using. However, for presentation graphics, which frequently integrate data residing in different data bases and noncomputer sources, quality and capability generally outweigh data compatibility considerations. Presentation graphics usually incorporate less data and more text than do graphics used for analysis. It is usually faster to type in additional text than to search through and import parts of an external data base.

Nonetheless, the ability to import data from frequently used data bases is an important consideration, especially if you plan to use the same program for analysis and presentation. If the program supports the popular .DIF file format, it can be used with a number of programs, including *VisiCalc* and *1-2-3*. Some programs can also read popular mainframe formats such as FORTRAN flat files. A multiple-window operating environment, which enables powerful stand-alone programs to interact with each other, may be the best solution for developing presentation graphics from a variety of sources.

The Demonstration

Once you have answered the basic questions outlined here, you should be able to narrow your choices to a few graphics packages that suit your needs. At that point nothing substitutes for a hands-on demonstration of the packages that you are considering. Some salespeople will offer you a "canned" demonstration of the system, but you should also insist on a chance to sit down yourself and actually produce a chart. Have samples of some commonly used charts available so you can reproduce them using the system. Critical shortcomings and potential problems that may have been overlooked will quickly surface. Make sure the hardware and software configuration you are testing is comparable to the one you have budgeted for; hardware can make a difference in the quality of the output.

High-quality graphics software and peripherals can bring benefits the first day. By carefully selecting a package that addresses your requirements, you can ensure that when it's time for your 30-minute presentation, your software won't add to the stage fright, but will reduce it.

David L. Wilcox is vice president of sales at Graphic Communications, Inc., in Waltham, Massachusetts.

Cooking Up a Batch File

A batch file for the PC is like a recipe. In a few simple steps, you can whip up a file of DOS commands that automatically execute in a sequence you specify. Quick, easy, and error free—if you use the right ingredients.

David Arnold and Seth Novogrodsky

A batch file is a text file of one or more DOS commands and contains the file-name extension .BAT. Any DOS command, including those that call application programs, can be used in a batch file. To execute the commands contained in a batch file, type the file's name without the extension. Batch files that contain only internal DOS commands such as COPY, DIR, and B: can be run from any disk or drive. But to use batch files that call external DOS commands such as FORMAT, CHKDSK, and COMP or call application programs such as *WordStar*, *dBASE*, and *1-2-3* (using the program mnemonics WS, DBASE, and 123 respectively), the command files called must be in the drive specified (or assumed as the default) by the batch file command. That is also true for any external command issued from the keyboard at the DOS prompt. For example, FORMAT.COM must be in drive B: when you (or a batch file) give the command B:FORMAT A:. Batch file commands, however, execute as soon as the previous batch file command is done. Thus, if DOS finds a command file missing, it will display the message 'File not found', and the batch file will continue with its next command, producing unexpected results.

You can create a batch file using the COPY CON: *filename* command (which is shorthand for *copy from the console*, or keyboard, to the specified file) or a text editor such as EDLIN. This article assumes that you are using DOS 2.00 or a later version. The ECHO and IF commands will not work properly with earlier versions.

AUTOEXEC.BAT is a special batch file that executes automatically when you power up the system or reset it by pressing <Ctrl>-<Alt>-<Del>. It is just like any other batch file, however, in that it may be executed from DOS at any time by typing **AUTOEXEC**. Many software packages include AUTOEXEC.BAT files to assist you in running an application.

Stopping a Batch File

Occasionally, you may want to halt the execution of an AUTOEXEC.BAT file or some other batch file. As with most DOS operations, you can usually stop the execution of a batch file by pressing <Ctrl>-<Break>. This aborts the current operation, and the message 'Terminate batch job (Y/N)?' is displayed. You must decide whether to abort the batch instructions entirely or continue with the remaining operations.

To prepare for the following batch file experiments, first power up the system with the original DOS disk in drive A:, and format a new disk in drive B: with the command **FORMAT B:/S** **< Enter >** . Next copy CHKDSK.COM to the disk in drive B: by typing **COPY CHKDSK.COM B:** **< Enter >** . Then replace the DOS disk with the DOS Supplemental Programs Disk (the other disk in the back of the DOS manual), and copy all the BASIC programs from that disk onto the disk in drive B: by typing **COPY *.BAS B:** **< Enter >** . Now change the default drive to B: by typing **B:** **< Enter >** . As with all DOS commands, you may type the commands in uppercase, lowercase, or both.

Experimenting with batch files is the best way to discover how you can take advantage of them. For example, you might want to make copies of all the BASIC programs on a given disk. Such a precaution might prove useful in the event that a program is inadvertently erased or the disk develops a defective sector. You can type **COPY *.BAS *.BA2** **< Enter >** to do this, but rather than typing this cumbersome command each time you want to make copies of your BASIC programs, you can type it into a batch file only once and then use that batch file to perform the operation. At the B> prompt, type the following (notice that <Enter> is pressed at the end of each line):

COPY CON: DUPLIC.BAT **< Enter >**
COPY *.BAS *.BA2 **< F6 >** **< Enter >**

Hints From the Help Screen

The gallery of *Help Screen* queries contains an explanation of how a batch file tests for an empty DOS variable.

Q. I developed a "no frills" on-line help system for people in my office who are reluctant to use the DOS manual. It consists of several ASCII files, each containing up to a full screen of information on a particular command. These screens are called up via a batch file called HELP.BAT.

The ASCII files themselves are straightforward. Each has been given the name of the corresponding command and the extension .HLP; for example, COPY.HLP gives information about the COPY command.

HELP.BAT is also straightforward. Its only instruction (other than coloring the screen to identify a "help" screen) is TYPE %1.HLP. HELP.BAT works fine except that I don't like the way users must call HELP.HLP, which tells how to use the help facility. Typing HELP HELP works, but I would like to get the same result by just typing HELP. I tried IF %1 = "" and IF %1 = " ", but neither worked.

Leo Lefkowits
Houston, Texas

A. Only two minor errors stand in your way. First, a batch file conditional test (the IF command) for string equivalency is requested by the use of two equal signs. Second, batch files use the space, not the quotation mark (as does BASIC), to delimit a string. So how do we represent an empty string and avoid the syntax error generated when the double equal signs are followed by a blank? The answer lies in the way DOS concatenates strings and DOS string variables (%0, %1, %2, etc.). Simply add a dummy character (for example, the *x* in the second line of the following listing) to both sides of the double equal signs. And always place the DOS string variable on the right side of the double equal signs. 'IF x = = %1x' is only true when the DOS string variable %1 is empty. The listing that follows demonstrates the techniques you want for HELP.BAT:

```
if exist %1.hlp goto does
if x= =%1x goto help
echo Help unavailable for %1
goto end
:does
type %1.hlp
goto end
:help
type help.hlp
:end
```

To create a batch file in this way, begin with the COPY CON: command. The batch file ends with <F6> <Enter> or <Ctrl>-Z <Enter> (which appears as '^Z'). COPY CON: tells DOS that the following keyboard (console) data should be copied into

Rather than typing a cumbersome command each time you want to make copies of your BASIC programs, you can type it into a batch file only once and then use that batch file to perform the operation.

the file named on the right (DUPLIC.BAT). The function key <F6> tells DOS that you are finished typing in the batch file.

To execute the batch file, type **DUPLIC < Enter >**. Note that the entire command appears on the screen as if you had typed in each character yourself. By displaying a directory of drive B: (**DIR B: < Enter >**), you can see that your batch file has made a copy of all the BASIC files and has given each a new extension (.BA2).

Batch files are useful for combining several commands into one. The next batch file displays a wide directory (DIR /W) and a disk status report (CHKDSK) with a single command. Type

COPY CON: DIRCHK.BAT < Enter >
DIR /W < Enter >
CHKDSK < F6 > < Enter >

To execute this batch file, just type **DIRCHK < Enter >**.

An AUTOEXEC.BAT file can be used to initiate the use of a program automatically whenever the computer is turned on or rebooted. You can create a batch file that will automatically prompt you for the date and time, change the default to B:, and load *WordStar* from drive A:. To create this file, type

COPY CON: AUTOEXEC.BAT < Enter >
DATE < Enter >
TIME < Enter >
B: < Enter >
A:WS < F6 > < Enter >

```
B>dirchk2 *.com

B>dir *.com/w

 Volume in drive B has no label
 Directory of B:\

COMMAND  COM    CHKDSK   COM
        2 File(s)     224256 bytes free

B>chkdsk *.com

   362496 bytes total disk space
    22528 bytes in 2 hidden files
   115712 bytes in 30 user files
   224256 bytes available on disk

   262144 bytes total memory
   237568 bytes free

All specified file(s) are contiguous.

B>
```

Figure 1: DIRCHK2.BAT display using replaceable parameters

Replaceable Parameters

Many DOS commands are used with mandatory or optional parameters. The parameters are generally used to indicate disk drive designators or the names of files. Because the parameters will probably be different each time a batch file is executed, you will need to specify replaceable parameters (also called DOS variables) within the batch file, instead of actual parameters. Replaceable parameters are indicated by a percent sign preceding any single-digit number (%0, %1, and so on up to %9). When the batch file is executed, %0 is replaced by the DOS command itself (that is, the name of the batch file), %1 is replaced by the first parameter specified on the command line after the name of the batch file, %2 by the second parameter specified, and so forth.

Replaceable parameters make batch commands more flexible. For example, in the DIRCHK.BAT file shown, there is no way to designate a disk drive or a specific file. To create DIRCHK2.BAT, a file that uses a replaceable parameter, type

```
COPY CON: DIRCHK2.BAT <Enter>
DIR %1 /W <Enter>
CHKDSK %1 <F6> <Enter>
```

With such a parameter, you can execute the DIRCHK2 command in a number of ways. Typing **DIRCHK2 A:** <Enter> asks for a directory and a CHKDSK (check disk) of drive A:. Typing **DIRCHK2 *.COM** <Enter> asks for a directory of all files having the .COM extension on drive B: (the default drive) and a CHKDSK of the specified files on drive B: (see Figure 1). By using replaceable parameters and asking for different variables during the execution of a batch file, you can achieve countless variations.

Subcommands

Four subcommands (ECHO, REM, PAUSE, and IF) enable the computer to communicate with you during batch file execution. By using the ECHO, REM, and PAUSE subcommands liberally within batch files, you become more aware of what the computer is doing while a batch file is executing.

ECHO. You may want to suspend the automatic display of DOS commands so the screen will not be cluttered. The ECHO subcommand can stop and start the automatic display of DOS commands as they are being executed from a batch file.

To disable automatic display, place an ECHO OFF command at the beginning of the batch file. Note that the ECHO OFF command is displayed as it is executed, although the commands following it are not. At any time you can determine whether ECHO is on or off simply by typing **ECHO** <Enter> from the DOS prompt. Normally ECHO is on.

ECHO can also be used to display messages while a batch file that has stopped displaying its commands is executing. To do this, put an ECHO command in the batch file, followed by the message (on the same line). For example, type

```
COPY CON: DIRCHK3.BAT <Enter>
ECHO OFF <Enter>
ECHO * DIRECTORY & STATUS REPORT * <Enter>
DIR %1 /W <Enter>
CHKDSK %1 <F6> <Enter>
```

As usual, you can run the batch file by typing **DIRCHK3**, and you can indicate the appropriate disk drive as an optional replaceable parameter, as in **DIRCHK3 A:**.

REM. You may want to include remarks in a batch file. Although you can display comments with the ECHO subcommand, you may want to include general comments about the purpose of the batch file by using the REM subcommand (REM stands for *remark*). The REM subcommand consists of 'REM' followed by a space and a comment (on the same line). Remarks can be up to 123 characters long. Unless the ECHO feature is turned off, the remarks (along with 'REM') will be displayed on the screen while the batch file is being executed. To demonstrate these features type:

```
COPY CON: REMARK.BAT <Enter>
REM This is a sample batch file that demonstrates the REM
  <Enter>
REM command. These REMarks will be displayed when
  <Enter>
REM this batch file is executed. <Enter>
ECHO OFF <Enter>
REM This remark will not be displayed. <F6> <Enter>
```

By using the ECHO, REM, and PAUSE subcommands liberally within batch files, you become more aware of what the computer is doing while a batch file is executing.

Now type **REMARK** and press <Enter> to run the batch file. The ECHO OFF command stops the display of DOS commands so that the text of the remark that follows is not shown.

PAUSE. The PAUSE subcommand halts the execution of a batch file and displays the message 'Strike any key when ready . . . '. At this point you must press any character key (including the <Enter> key, the <Esc> key, or the <Space> bar) to resume execution of the batch file. The PAUSE subcommand can be used to produce another variation of the DIRCHK batch file. To try this out, type the following:

COPY *.*

The gallery of *Star-Dot-Star* queries contains a tip on how to use a RAM disk to speed the execution of a batch file and reduce wear and tear at the same time.

I find that I put lots of commands into my AUTOEXEC.BAT files. Between asking the clock what time it is and setting up the serial port, print spooler, and disk emulator, most of the batch files are 10 to 15 lines long. The problem is that the long batch files result in a lot of disk drive head movement as DOS reads a line from the batch file, executes the command, and then goes back to read another line. I've adopted the following technique to help guard my disk drives against excessive wear.

As shown in the following listing, my AUTOEXEC.BAT files create a disk emulator, copy a batch file containing the remainder of the start-up commands into the RAM disk, and then transfer execution to that file.

```
echo off
ramdisk c: > nul
copy continue.bat c: > nul
c:continue
```

The secondary batch file is read from the floppy disk in one large block rather than line by line; the results are less disk activity and faster operation.

Notice the characters '>nul' after each command in the batch file. They cause the screen output to be suppressed. I use them to prevent messages such as '1 file(s) copied' from appearing after an ECHO OFF command has been issued.

The I/O redirection feature of DOS 2.00 can also be used to provide a much more powerful form of batch processing. The last command shown in the following batch file causes a secondary copy of the DOS command processor (COMMAND.COM) to take control and to receive its input from the disk file CONTINUE.SPL instead of from the keyboard.

```
echo off
ramdisk c: > nul
copy command.com c: > nul
copy continue.spl c: > nul
c:command < c:continue.spl
```

Passing control in this way is especially useful because data is taken from the disk file in place of all keyboard input, including responses to the prompts of other programs. I use the extension .SPL for these files to distinguish them from batch files because some lines in .SPL files are commands, but other lines are the responses to program prompts.

The last line in the file must be the EXIT command. This is very important because the secondary copy of COMMAND.COM will take its input only from the disk file. Without the EXIT command there doesn't seem to be any way to regain control short of rebooting.

Jon Shemitz
Ben Lomond, California

Editor's note: Loading a secondary copy of COMMAND.COM consumes about 17K of RAM.

```
COPY CON: DIRCHK4.BAT <Enter>
ECHO OFF <Enter>
ECHO * DIRECTORY & STATUS REPORT * <Enter>
DIR %1 /W <Enter>
ECHO * Status report coming up * <Enter>
PAUSE <Enter>
CHKDSK %1 <F6> <Enter>
```

IF. Using the IF subcommand, you can write a batch file that performs certain operations only if specified conditions are met. You can also base the conditional execution of a DOS command on the value of a replaceable parameter. (See the sidebar "Hints from the Help Screen" for an example of how to have the IF subcommand test for an empty replaceable parameter.)

An AUTOEXEC.BAT file can be used to initiate the use of a program automatically whenever the computer is turned on or rebooted.

The following batch file displays the directory entry of a file specified by the first parameter (%1) no matter what second parameter is specified. And if an optional second parameter (%2) has the value of T, the contents of the designated file (%1) will also be displayed on screen. Type

```
COPY CON: DIRTYP.BAT <Enter>
DIR %1 <Enter>
IF x%2==xT TYPE %1 <F6> <Enter>
```

To display the directory entry of COMM.BAS, and the file's contents, type **DIRTYP COMM.BAS T <Enter>**.

Just as a baker must determine whether all the ingredients are available before starting to make a cake, you may want a batch file to determine whether a file exists before the batch file performs a certain DOS operation. The IF command allows you to make the execution of a DOS command dependent upon the existence of a specified file. For example, you can create a batch file that will display the directory listing for a file. Type

```
COPY CON: CHKFILE.BAT <Enter>
ECHO OFF <Enter>
ECHO This file helps prevent duplication of file names.
<Enter>
IF EXIST %1 DIR %1 <F6> <Enter>
```

You can test this batch file by typing **CHKFILE COMM.BAS <Enter>**. Now try executing the command with a file not on the disk. For example, type **CHKFILE NEWNAME <Enter>**.

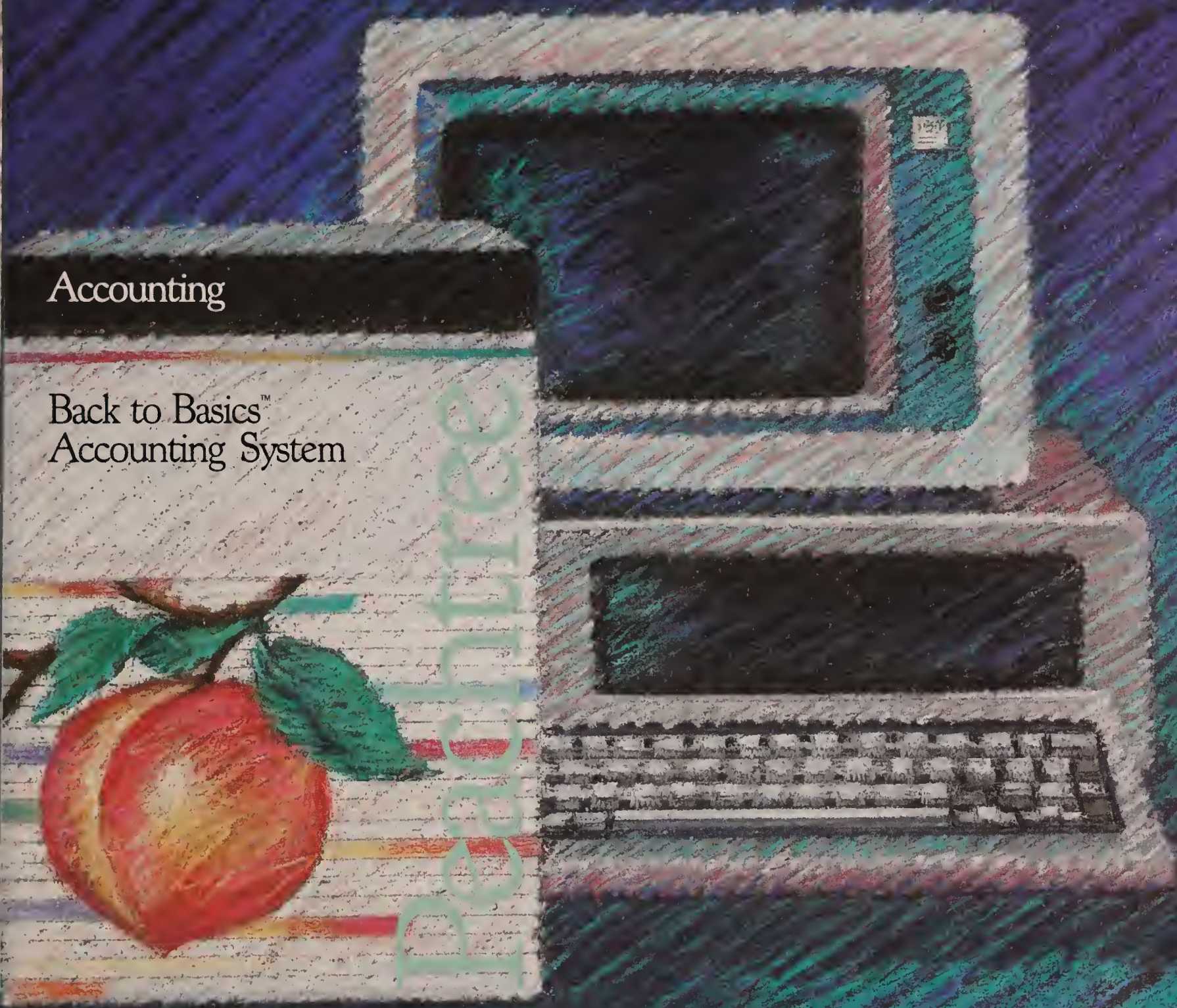
You can negate the condition in an IF command by typing NOT immediately after IF. You might want to replace the last line in CHKFILE.BAT with **IF NOT EXIST %1 ECHO File %1 does not exist.** This command will check the disk's contents to see if the named file exists. If the file doesn't exist, a message on the screen will say so.

Because any DOS command can be executed in a batch file, you can have your computer perform a series of complex operations while you sit back and watch. (See the sidebar "COPY *.*" for a tip on using a RAM drive to speed the execution of a long batch file.) You needn't be an experienced programmer to start cooking up batch files. Try your hand–and bon appetit.

David Arnold is a professor of sociology at Sonoma State University in Rohnert Park, California. He teaches a course on computers and society and has written a book about the IBM PCjr, published by Holt, Rinehart and Winston. Seth Novogrodsky is a Contributing Editor to PC World Books.

Copyright 1984 by David Arnold and PC World Communications, Inc. From the book Getting Started with the IBM PC and XT, *Simon and Schuster, Inc., 1984. Printed by permission.*

Our "Back to Basics" Solution To Your Accounting Needs.



Back to Basics Accounting System by Peachtree Software® is an uncomplicated, easy-to-learn accounting system for small businesses.

You don't need any accounting experience and barely need any computing experience. The straightforward manual teaches both accounting and computing at the same time.

But make no mistake. This is a full-featured, interactive system including General Ledger, Accounts Payable and Accounts Receivable. And it's available for IBM,® Apple,® Atari® and Commodore microcomputers.

Uncomplicated—easy-to-learn—yet full featured. That's Back to Basics.

For more information, contact your local dealer or Peachtree Software, 1-800-554-8900.

America's Software grows on the Peachtree.®

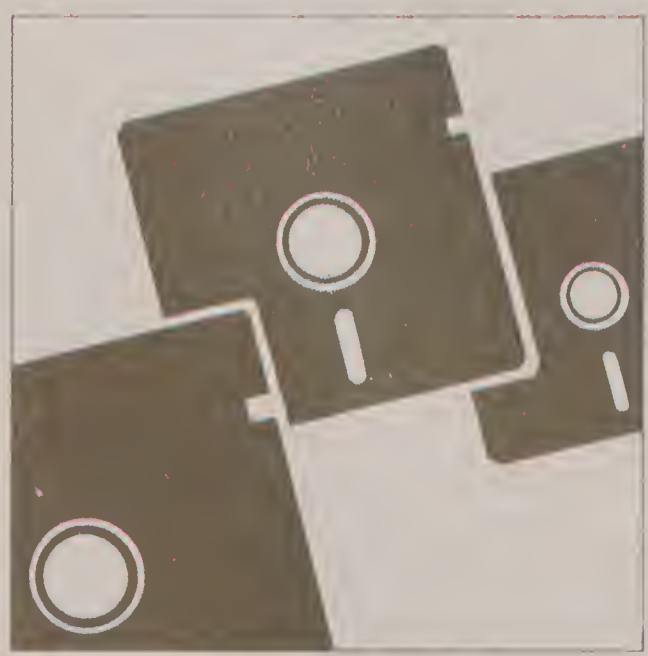
Peachtree Software

Apple is a registered trademark licensed to Apple Computer, Inc. Atari is a registered trademark of Atari, Inc. IBM is a registered trademark of International Business Machines Corp. Peachtree and Peachtree Software are registered trademarks of Peachtree Software Incorporated, an MSA Company.

Circle 286 on reader service card

Evaluating software programs will never be the same

PC WORLD Software Sample Pack



Selecting software is often a search abbreviated by time restraints. You quickly resort to one of two methods:

- the "safe buy," simply purchasing the leading program; or
- the "frugal buy," choosing a less established, less expensive package and hoping it will perform as well.

PC World has developed a unique solution that allows you to select software with confidence: *PC World Software Sample Pack.* Simply let us know your personal computing requirements, and we'll send you demonstrations of the software programs that relate to your needs and interests. These will be not only the market leaders, but also important high-quality software that hasn't received a wide range of publicity.

PC World Software Sample Pack allows you to boot up program demonstrations and try them for yourself. Now you can find out before you buy a program whether it will do the job you want it to do. And you can evaluate these products on your terms, in your own work environment, at your own pace.

And it is made available to you at no cost. However, only qualified subscribers will receive this complimentary subscription. Just fill out the attached card and return it to *PC World.* Those qualified will be sent software samples throughout the year.

Subscribe now to receive software demonstrations tailored to your needs and preferences. Remember, there's absolutely no charge to you at any time for *PC World Software Sample Pack*

PC WORLD Software Sample Pack

Subscription Application

Name _____

Address _____

_____

City, State, Zip _____

YES! I would like a free subscription to *PC World Software Sample Pack.*

1. When your company purchases software, are you involved in the decision-making process?
   ☐ Yes ☐ No
   If yes, in what capacity?
   ☐ Authorize purchase
   ☐ Specify product
   ☐ Make recommendations and/or suggestions

2. If you authorize software purchases for your company,
   a) what type of budget do you administer?
   ☐ Total corporate budget
   ☐ Individual departmental budget
   b) what is the size of your budget for purchasing software?
   A. ☐ Less than $750
   B. ☐ $750-$1499
   C. ☐ $1500-$2499
   D. ☐ $2500-$4999
   E. ☐ $5000-$9999
   F. ☐ $10,000-$24,999
   G. ☐ $25,000-$50,000
   H. ☐ Greater than $50,000

3. Over the next 18 months, what type of IBM PC or compatible software does your company plan to purchase?
   A. ☐ Word processing
   B. ☐ Spreadsheet
   C. ☐ Data management
   D. ☐ Integrated applications package
   E. ☐ Graphics
   F. ☐ Communications
   G. ☐ Networking
   H. ☐ Investment/financial management
   I. ☐ Accounting
   J. ☐ Profession/industry specific (please specify)
   _____
   K. ☐ Other (please specify)
   _____
   _____

I have filled out this application completely. [You must answer all questions completely for a free subscription to *PC World Software Sample Pack.*] *

Signature _____

Date _____

Title _____

Company _____

Business Phone _____

* Your answers to this questionnaire will determine your qualification.

(Fold on this line)

From

AFFIX
FIRST-CLASS
POSTAGE
HERE

PC World Software Sample Pack
PC World Communications, Inc.
555 De Haro Street
San Francisco, CA 94107

Staple or tape & mail

HERE

DOS *JUST GOT BETTER. . .*

Now you can use DOS the way it was intended. . .

from your very first try!

$59.00 PROTECTED

$99.00 UNPROTECTED

WHAT IS DOS?
WHAT DOES IT DO?
WHY DO I NEED IT?

To beginners, these are the most frequently asked questions. **DOS** is an acronym for *Disk Operating System.* It is actually a series of programs which allow the computer to run programs, copy diskettes, direct data to a printer, and many other things. **DOS** must be loaded or read into the computer to accomplish any of the tasks asked of it. The computer can perform a tremendous amount of work in a relatively short amount of time. Imagine a very expensive race car with the capability to accelerate quickly and sustain a high rate of speed for a long duration of time. The only constraint is that it must have an expert driver to control and guide all aspects of its operation. A computer must also be controlled and guided in order to achieve the desired results. **DOS-HELP** is simply a tool to help use the computer at its fullest capacity. **DOS-HELP** can also be used as a boot disk.

FEATURES

- Easy to Use
- Ready to Run
- Allows Easy Selection from A Wide Range of Color Combinations
- Helps You Learn **DOS** by Example

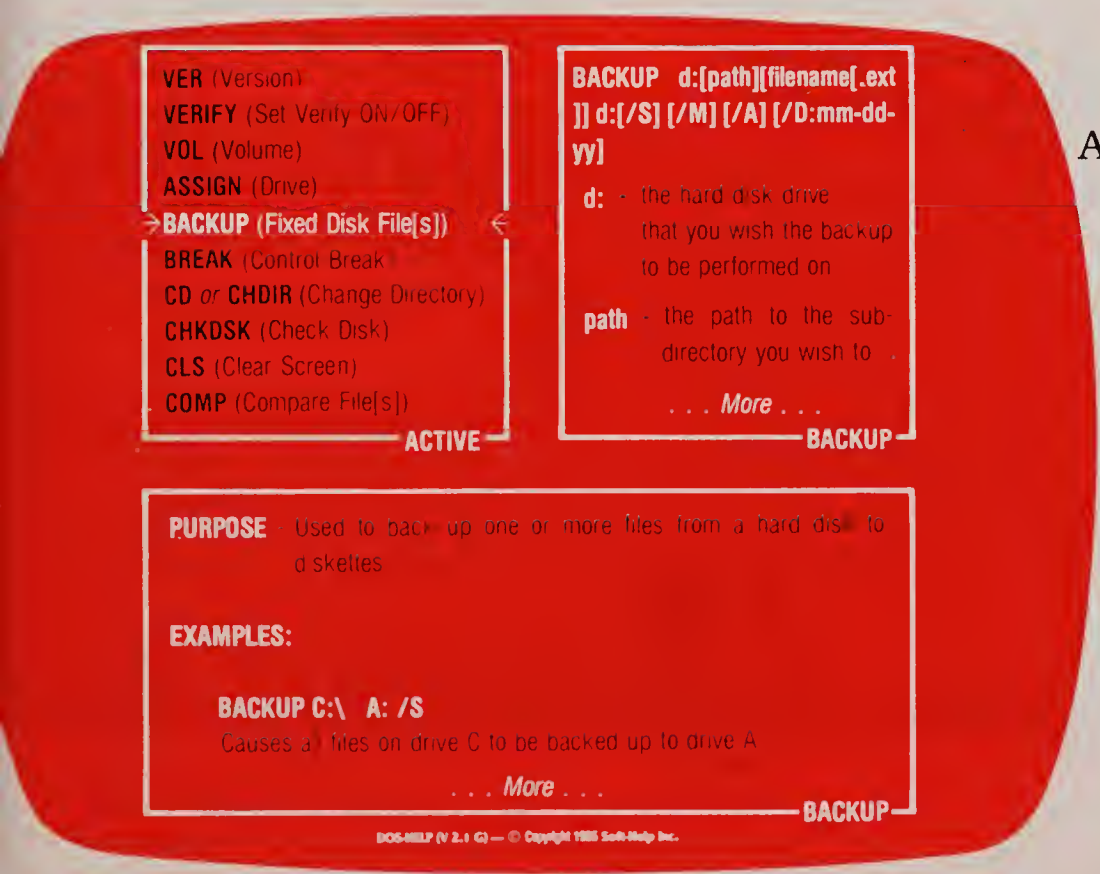
DOS-HELP COPY PROTECTED
Quantity_____at $59.00

DOS-HELP COPY UNPROTECTED
Quantity_____at $99.00

Soft-Help Inc.
1550 Industrial Park Drive
Nederland, Texas 77627

Name_____
Shipping Address_____
_____
City_____
State _____ Zip _____
Telephone (____) _____
Amount (TX 5¼% tax)_____
Payment: ☐VISA ☐MC ☐American Express ☐Bank Draft ☐Check
Credit Card Expir. Date_____/_____
Card #_____

COD's WILL NOT Be Accepted. Texas Residents: Add 5¼% sales tax. SHIPPING: Add $4 each for shipping and handling. Outside U.S.A. add $10 and make payments by bank draft, payable in U.S. dollars drawn on a U.S. bank.



REQUIREMENTS

At least 128K of RAM • DOS 2.0 or greater
Runs on IBM Personal Computer, PCjr, PC/XT and PC/AT
Compaq Plus and Deskpro
and other truly compatibles.

SOFT-HELP INC.

1550 Industrial Park Dr.
Nederland, TX 77627
409/ 724-0142

Circle 144 on reader service card

Bring your PC up to AT speed with Univation.

Introducing the Univation Turboboard system accelerator.

Now you can get the speed and performance of an AT without all the expense. The Univation Turboboard will triple the speed of your PC or PC/XT, allowing you to do more, in less time, to more fully utilize your existing investment.

The Univation Turboboard is totally compatible with most software application packages and enables you to expand the internal memory up to 640K. Our Turboboard will improve your data processing speed over 300% and has the power to handle systems such as Xenix and Unix.

The Univation Turboboard is easy to install. It comes with friendly software and complete, easy-to-follow instructions for installation and operation.

Fully tested, proven reliable and available now, a Univation Turboboard will give your existing PC/XT speed and performance like an AT for only $1,250*.

Turboboard Features:

- Fully integrated 8086 CPU
- 16-Bit Databus
- 9.54 MHz clock speed
- 300% Performance Improvement
- On board memory expansion to 640K
- Normal speed on/off switch
- Faster execution of ROM-based routine

Storage, Back-up & Security Removable and Fixed Disk Sub-Systems.

Make your PC perform just like an IBM-XT and improve its storage versatility with a hard disk sub-system from Univation. We feature innovative 5.5Mb & 10Mb, removable media hard disk systems and 10Mb, 20Mb & 30Mb fixed disk systems. We can configure them in any combination to meet your memory expansion needs.

Stack two half height 5.5Mb removable media drives in the right hand disk storage slot and you get XT memory with the added benefit of media backup protection, security and transportability. Combine a 5.5Mb removable drive with a 10Mb, 20Mb or 30 Mb fixed disk for extensive on-board storage capability with the ability to back-up, remove, transport and protect sensitive or critical data.

Univation's sub-systems are easy to install and come complete with controller, cables and our unique power supply booster/cooler. Univation disk drives can also be used externally.

Univation disk drives are extensively tested and guaranteed to give you years of problem-free service.

For more information on Univation products see your computer dealer today, or call 408/745-0180.

Univation is dedicated to making you and your PC as fast, efficient and productive as possible.

(*Price is suggested retail and includes 512K RAM. Corporate quantity discount and institutional prices on request.)

IBM is a registered trademark of International Business Machines Corp

Circle 261 on reader service card

UNIVATION

1037 North Fair Oaks Avenue
Sunnyvale, CA 94089
408/745-0180

NETWORKS • REMOVABLE HARD DISKS • PERFORMANCE ENHANCEMENTS • HARD DISK SYSTEMS

I'm Adam Osborne. I want you to know that you no longer have to pay ridiculous prices for top quality software.

***Yes,* you can get full-featured word processing for under seventy dollars.** So don't be fooled. The next time a sales person tells you an advanced word processor costs $400, he's either ignorant or putting his commission before your pocketbook.

Most software companies believe in *"perceived value pricing"*. If a software package saves you thousands of dollars, they argue, why shouldn't you pay hundreds for it—even though the program costs just a few dollars to produce. Based on that logic, a telephone should cost $500! After all, it saves you thousands in travel costs.

High software prices are currently maintained by a shaky coalition of software companies and some computer stores. **You've had no choice but to pay exorbitant prices whenever you bought software for your personal computer.**

I founded Paperback Software International to give you an alternative—Quality Software at Affordable Prices!

Ask for the Paperback Software alternative at your local bookshop, computer store, or software store. Or use the order form below.

NUMBER WORKS
The spreadsheet for budgeting, financial planning, expense reports, homework. Do *"what if?"* calculations, spot trends. 40 built-in math and finance functions. Spreadsheets can be as large as disk, not limited by memory like other programs. IBM PC w/128K, PCjr w/256K.

EXECUTIVE WRITER
Advanced word processing with word wrap, global search and replace, horizontal scrolling, centering and right justification, on-screen bold and underlining, headers, footers, footnotes, indices and tables of contents, macros, graphics. IBM PC w/128K, PCjr w/256K.

EXECUTIVE FILER
An electronic file cabinet. Keep anything you write organized and available at a keystroke. Combine with *Executive Writer* to switch between documents and filecards at a keystroke. Look up references. Do document assembly. Use *MailPrint* to generate form letters. IBM PC w/192K, PCjr w/256K.

DRAW-IT
Turns your computer into a full color electronic drawing board. Make pictures and illustrations, pie, bar, and line graphs, or just have fun! Easy-access help screens, simple commands, ready-to-use pictures and patterns. IBM PC w/128K, PCjr w/256K, color graphics card.

PAPERBACK WRITER
The affordable high-value word processor for everyday use. Easy-to-read instruction book makes you productive in minutes. Block operations, horizontal scrolling, word wrap, on-screen bold and underlining, search and replace. IBM PC w/128K, PCjr w/256K.

MY ABC's
Six educational games that are simple to learn and fun to play for preschoolers. They teach your child to recognize letters, count, and develop concentration skills. IBM PC/PCjr w/128K, color graphics card.

$39.95	$69.95	$49.95	$29.95	$39.95	$19.95
NUMBER WORKS	EXECUTIVE WRITER	EXECUTIVE FILER	DRAW-IT	PAPERBACK WRITER	MY ABC's
_____ copies: $ _____	_____ copies: $ _____	_____ copies: $ _____	_____ copies: $ _____	_____ copies: $ _____	_____ copies: $ _____

IBM is a registered trademark of International Business Machines Corp.

All products work on the IBM PC, PCjr, PC/XT, PC/AT and most compatible computers and require DOS version 2.00 or higher.

VISA MasterCard

Above total = _____
California residents add 6½% tax = _____
TOTAL = _____

☐ Check ☐ VISA ☐ MasterCard Card number _____

MC Bank number: _____ Expiration date: _____

Ship to: _____

Address: _____

City: _____ State: _____ Zip: _____

Signature: _____

Offer good in USA only. Allow 2-4 weeks for delivery. Free shipping. WO

Quality Software at Affordable Prices

Paperback Software
2612 Eighth Street
Berkeley, CA 94710

PAPERBACK SOFTWARE ™

Let's get straight to the point. We think our VTERM software is the most powerful and versatile micro-to-mainframe link you can buy for an IBM PC or compatible. The fact is,

NO OTHER COMMUNICATIONS PROGRAM DOES SO MUCH.

VTERM is a single integrated package that combines terminal emulation, file transfer, mainframe graphics, and general communications capabilities. As a terminal emulator, VTERM is unsurpassed by other software. It

TURNS YOUR PC INTO A VT100 OR TEKTRONIX 4010 TERMINAL.

The emulation is complete. Host software written for a VT100, VT52, VT101, VT102 or Tektronix 4010 will run without change using a PC and VTERM. You get throughput to 9600 baud, printer and plotter support, disk capture of graphics and text, easy-to-use setup screens, multiple setup files, programmable softkey macros, on-line help, automatic dialing, full keyboard emulation, and more.

FOUR ERROR-CORRECTING FILE TRANSFER PROTOCOLS

are supported by VTERM. They include our powerful VTRANS 7 and VTRANS 8 protocols. (VTERM comes with complete VTRANS host software for several host operating systems.) In addition, you get ASCII text file exchange and XMODEM, as well as the new micro-to-mainframe standard:

KERMIT. YES, KERMIT!

Kermit is a versatile error-correcting file transfer protocol developed at Columbia University. VTERM's Kermit supports wildcard transfers, server commands, data compression, command macros, and other advanced features. Kermit requires host software which is available at nominal cost from Columbia for many host operating systems.

THE VTERM HOT KEY

lets you switch instantly between DOS and VTERM, so you can run local programs without losing your terminal screen or link to your host.

132 COLUMN

display is emulated with horizontal scrolling or fully implemented with an optional adaptor board. VTERM can redisplay data that has scrolled vertically off the screen.

VTERM is now available in two versions. VTERM 4010 has all the features described above. VTERM II has all the features of VTERM 4010 except Tektronix 4010 emulation. VTERM runs on the IBM PC, XT, AT, Portable, and compatibles.

JOIN US AT
NEW YORK COLISEUM
JUNE 17-19 1985
BOOTH NO. 2012

Coefficient Systems Corporation
611 Broadway, New York, NY 10012
(212) 777-6707 ext. 204

Circle 166 on reader service card

.
Star-Dot-Star

A global exchange of personal computer discoveries

This month: a translate routine in BASIC, a program to update the system clock, and a tip for using Turbo Pascal

Edited by Steven Cook

Reader Richard McQuillan of Oakland, California, reports that as an authorized service technician he has received numerous warnings from IBM regarding the use of the SHIPDISK.COM program on the XT Diagnostics disk. Although the technique presented by Guy Zumpetta ("Parking Problem," *.*, *PCW*, January 1985) involves loading a special version of COMMAND.COM and therefore may be safe to use, it has not been endorsed by IBM. Mr. McQuillan recommends against using SHIPDISK.COM except as described in the *Guide to Operations* manual.

Several readers have written after testing a patch to prevent FORMAT.COM from operating on hard disks ("Format Fix," *.*, *PCW*, Vol 2, No. 12) and finding that the patched program does not halt when instructed to format disks in drives other than A: and B:. Rest assured that the patch works. DOS knows which drives are hard disk drives and which are not. The patch allows formatting of floppy disks in any drive, but it will stop any attempt to format a hard disk.

Parlez-Vous Anything?

In the course of developing software for the PC, I've encountered several situations that called for a translate function. Such a function is an intrinsic part of most high-level languages, but it is absent from BASIC. After some thought I devised the function shown in line 10 of XLATE.BAS.

The function looks very complicated–almost impossible to interpret–but if you study it closely you'll see that it performs a lookup-and-translate operation.

The FNXLATE$ function can be used for a wide variety of translation tasks, such as changing lowercase to uppercase, single characters to multiple characters, decimals to fractions, and month numbers to month names.

Note that when the source list entries are longer than 1 character, you may need to place a character between each of them to prevent false matches. In lines 70 and 90 a space is used for that purpose.

Remember to enter the function as one unbroken line. For each line, press <Enter> only after typing the final character, that is, only prior to typing lines that begin with 20, 30, 40, and so on.

Walt Muncaster
Deatsville, Alabama

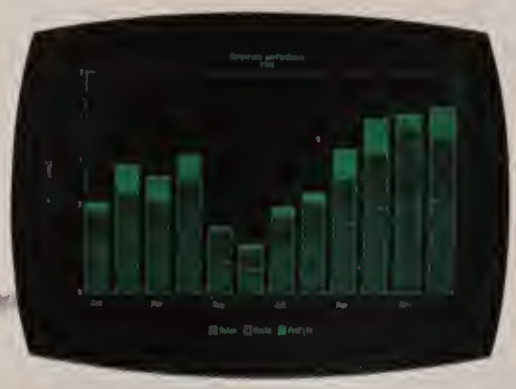
Date to Remember

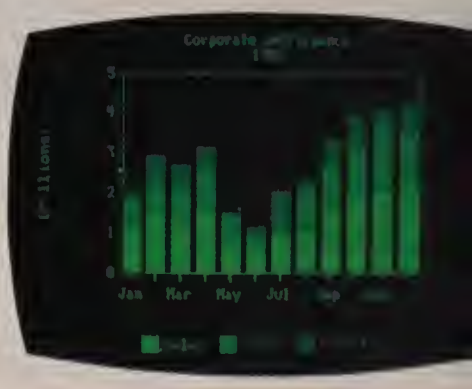
I have no clock/calendar in my PC, and I find it annoying to have to enter the same date several times a day. To alleviate the problem I have written the program DATENOW.COM. The program has two functions. One is to read the date from the disk file A:\DATE.DAT, and the other, invoked by the command DATENOW U, is to update the date on disk (only an uppercase *U* will activate the update mode).

Place the lines shown in DATEN.BAT in an AUTOEXEC.BAT file. Each time the computer is started with that file, it will read the date from the DATE.DAT file, allow you to confirm or correct it, then store the revised date. If the date is correct,

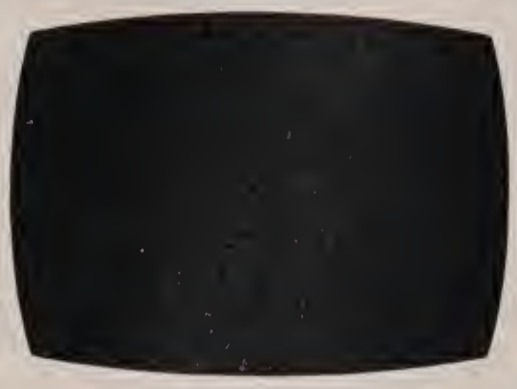
IBM MONOCHROME GRAPHICS. NO COMPROMISE.

Lotus™ 1-2-3™

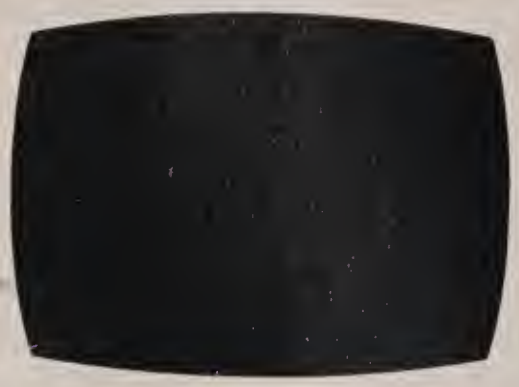


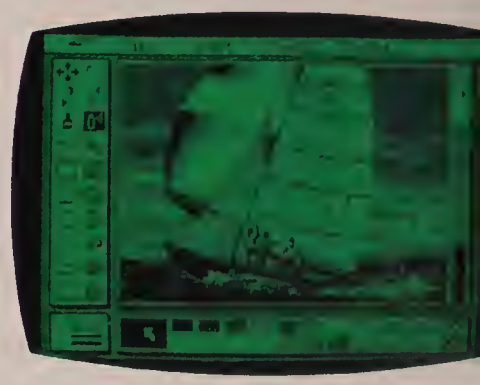


Flight Simulator®



Mouse Systems™
PC Paint

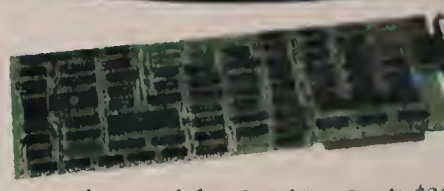




IBM PC Tutorial®

The Hercules Graphics Card™ $499

The IBM® Monochrome Adapter $250



The Paradise Modular Graphics Card™ $3

The Paradise Modular Graphics Card is the *only* video card that runs all popular IBM color/graphics software—full-screen—on an IBM (or equivalent) monochrome monitor. *Unmodified.*

Right off the shelf.

And not just ordinary monochrome: Crisp, full-screen, flicker-free monochrome graphics translated in up to 16 shades.

- Includes IBM-compatible color graphics on an RGB or composite video monitor.
- Optional memory (up to 384Kb), clock calendar or floppy disk controller, and parallel, serial or game ports available.

All in a single PC or XT slot.

This may be the only card you'll ever need.

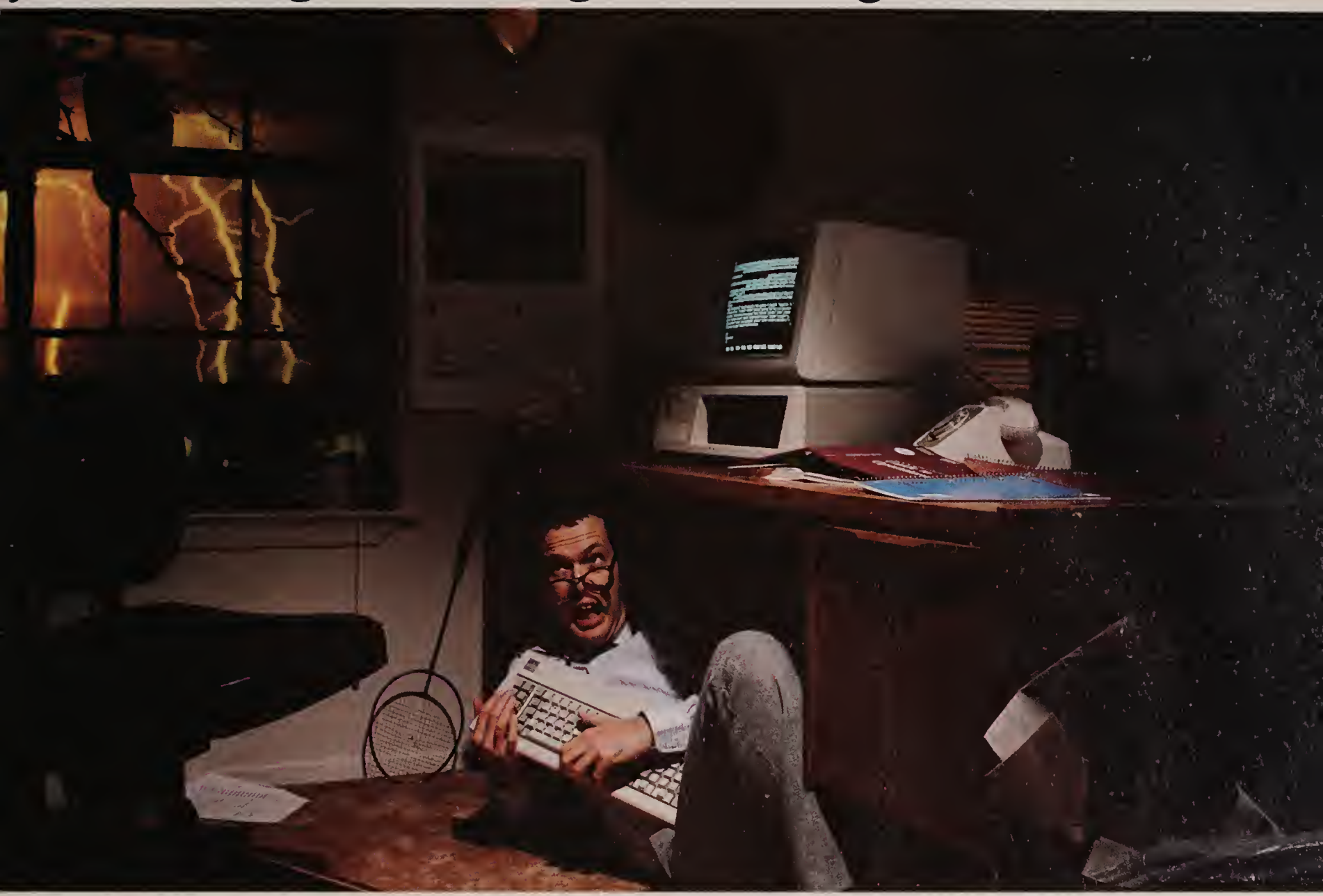
Call today for more information:
1-800-527-7977, In CA: 1-800-822-2020 (Dept. 173)
150 North Hill Drive, Brisbane, CA 94005, 415-468-6000

PARADISE

You can measure it

Trademarks: Paradise Modular Graphics Card–Paradise Systems, Inc. Hercules Graphics Card–Hercules Computer Technology. 1-2-3, Lotus–Lotus Development Corporation. Mouse Systems, PC Paint–Mouse Systems Corporation. Registered trademarks: IBM, PC Tutorial–International Business Machines Corporation. Flight Simulator–Microsoft Corporation.

If lightning still scares you, you're using the wrong file manager.



Be sure. Btrieve™.

Lightning may strike. But it doesn't have to destroy your database.

Btrieve™ file management offers automatic file recovery after a system crash. So accidents and power failures don't turn into database disasters. Your Btrieve-based applications will come up when the lights come back on.

Fast. Btrieve is lightning fast, too. Its b-tree file structure automatically balances—you never waste time reorganizing the index. And Btrieve is written in Assembly language especially for the IBM PC™. The result: electrifying speed on file maintenance routines. Applications that run fast. Users who don't waste time waiting.

The standard for networking. When your application requires multi-user file sharing, Btrieve/N (network version) sets the standard for the industry's most popular LANs: IBM's PC Network, Netware™, Davong MultiLink™, Omninet™, PC Net™, EtherSeries™, Nestar™, and NetOne™. Btrieve/N offers **safe** network file management that coordinates simultaneous updates and protects against lost data.

Fully-relational data management. Using SoftCraft's entire family of products gives you a complete, fully-relational database management system. Rtrieve™ adds report writing capabilities for generating the reports you need. Xtrieve™ speeds users through database queries with interactive, on-screen menus—no command language or special syntax.

For professional programmers. Btrieve is the fast, reliable answer for all your application development. In any development language—BASIC, Pascal, Cobol, C, Fortran, and APL. With multikey access to records. Unlimited records per file. Duplicate, modifiable, and segmented keys. Variable cache buffer.

With Btrieve, you can develop better applications faster. And know they'll be safe if lightning strikes.

Suggested retail prices: Btrieve, $245; Btrieve/N, $595; Xtrieve, $195; Xtrieve/N, $395; Rtrieve, $85; Rtrieve/N, $175. Requires PC-DOS or MS™-DOS 1.X, 2.X, or 3.X.

Btrieve, Xtrieve, and Rtrieve; IBM; Netware; Davong MultiLink; Omninet; PC Net; EtherSeries; Nestar; NetOne; and MS are trademarks of SoftCraft Inc.; International Business Machines; Novell Data Systems; Davong Systems Inc.; Corvus Systems; Orchid Technology; 3Com Corp.; Nestar Systems Inc.; Ungermann-Bass; and Microsoft Inc.

SC

SoftCraft Inc.

P.O. Box 9802 #917
Austin, Texas 78766
(512) 346-8380 Telex 358 200

Circle 173 on reader service card

```
XLATE.BAS:  A translation function in BASIC

10 DEF FNXLATE$(S$,T$,A$,S,T)=MID$(T$,((-((T=1)*(-((S=1)*
INSTR(S$,A$))-((S<>1)*(INSTR(S$,A$)\S+1))))-((T<>1)*
(((-((S=1)*INSTR(S$,A$))-((S<>1)*(INSTR(S$,A$)\S+1)))-1)*
T+1)))*-(INSTR(S$,A$)>0))-(INSTR(S$,A$)=0)*255,T)
20 ' Line 30 demonstrates lowercase to uppercase translation
30 UPPER.CHAR$=FNXLATE$("abcdefghijklmnopqrstuvwxyz",
"ABCDEFGHIJKLMNOPQRSTUVWXYZ",LOWER.CHAR$,1,1)
40 ' Line 50 demonstrates single to multiple character conversion
50 N$=FNXLATE$("123456789","ONE  TWO  THREEFOUR FIVE
 SIX  SEVENEIGHTNINE ",N$,1,5)
60 ' Line 70 demonstrates converting decimals to fractions
70 FRACTION$=FNXLATE$(".125 .250 .375 .500 .625 .750 .875",
"1/81/43/81/25/83/47/8",DECIMAL.ENTERED$,5,3)
80 ' Lines 90-110 demonstrate translating month numbers to month names
90 MONTH.NOS$="01 02 03 04 05 06 07 08 09 10 11 12"
100 MONTH.WORDS$="January  February March    April    May
     June     July     August  SeptemberOctober  November December "
110 MONTH.NAME$=FNXLATE$(MONTH.NOS$,MONTH.WORDS$,LEFT$(DATE$,2),3,9)
120 '
200 ' The syntax and rules for using the function are as follows:
210 '
220 '   RESULT$=FNXLATE$(SOURCE$,TARGET$,ARGUMENT$,SOURCELEN,TARGETLEN)
230 ' Where:
240 '          SOURCE$ is the list of entries to be scanned.
250 '          TARGET$ is the list of values to be returned.
260 '          ARGUMENT$ is the value to match.
270 '          SOURCELEN is the length of each entry in SOURCE$
280 '                    ( 0 < SOURCELEN < 255 )
290 '          TARGETLEN is the length of each entry in TARGET$
300 '                    ( 0 < TARGETLEN < 255 )
310 '
320 ' A null value is returned if no match is found for ARGUMENT$
999 END
```

XLATE.BAS: A translation function in BASIC

```
datenow
date
datenow U
```

DATEN.BAT: Add these lines to AUTOEXEC.BAT to employ DATENOW.COM.

as it will be for an entire day once you correct it, you need only press <Enter> to accept the current value.

The program requires DOS 2.00 or a later version and sets errorlevel if an error occurs. If you want to store the DATE.DAT file on drive C:, change the last three values in DATA line 6 (line 1060) from 41, -1, and 12 to 43, -1, and 22.

Garrett Wollman
Burlington, Vermont

Editor's note: To create DATENOW.COM, load BASIC, then type in and RUN the lines shown in DATENOW.BAS. You may wish to save lines 10-180 separately. They will be useful in creating a variety of programs that will appear in this column.

Turbo Trick

When a program written in Turbo Pascal ends, DOS must reload the COMMAND.COM file into memory. If DOS cannot find the file, it

Equipping a PC for business takes a hard disk. Turn to SYSGEN™ when you want the best.

Smart disk users insist on tape for data file back-up. SYSGEN is the leader.

And, if your needs begin to exceed the limits of PC memory and slot expansion, SYSGEN has the solution.

18 Megabytes and 6 expansion slots for the PC, XT, or AT™. $1995.

For demanding PC owners who need more versatility and memory, Sysgen introduces a powerful, reliable, and unique solution: The DISK I/O™.

It includes 6 new expansion slots for your choice of plug-in boards, plus, an 18 MByte hard disk—all for slightly more than a hard disk alone.

Sysgen offers the full range of expansion, storage, and tape back-up solutions with the best performance ratings for the IBM® PC, XT, AT and compatibles.

For more information on the Sysgen family of expansion products contact your local dealer.

SYSGEN
INCORPORATED

47853 Warm Springs Blvd.,
Fremont, CA. 94539
(415) 490-6770 Telex 4990843

See us at Comdex, 3240 World Congress Center

Trademarks: Sysgen, DISK I/O—Sysgen, Inc.; AT—International Business Machines Corporation. Registered trademarks: IBM—International Business Machines Corporation.

Dac-easy accounting

$49.95

Introductory Price

The software revolution of the year!

All 7 complete modules on 1 disk! Compare our features with other packages costing thousands more!

General

- Menu Driven • Fully Integrated
- MS-DOS & PC-DOS
- RUNS ON PCjr, PC, XT, AT, AND COMPATIBLES
- Password Protection In All Programs
- Slipcased Binder
- OVER 300 DIFFERENT REPORTS!!
- OVER 90 ROUTINES!!
- File Capacity Limited Only By Disk Space
- Service Contract Available
- ONLY $49.95 FOR ALL 7 MODULES
- Money Back Guarantee

General Ledger

- Double Entry • Unlimited # Of Accounts
- Multi-Level Accounting
- Unlimited Departments
- 3 Year Account History For CRT Inquiry
- Pencil & Pen Feature To Correct Mistakes Without Reverse Entries
- UNIQUE Budgeting Routine (See Forecasting)
- CRT Voucher Inquiry
- All Reports Compared to Last Year or Budget
- Unlimited Journals

Accounts Receivable

- Open Item or Balance Forward
- 7 Customized Columns For Aging Report
- Unlimited # Of Customers
- Mailing Labels With 4 Different Sorts
- Automatic Finance Charges
- Supports Partial Payments • Directories
- 3 Year Customer History for # Of Invoices, Sales, Costs, And Profits
- Customized Text On Statements
- Cash Flow Analysis • Sales Analysis
- Automatic Sales Forecasting By Customer, Salesman, Or Customer Type

Accounts Payable

- Check Printing • Automatic Allocation Of Available Cash To Payables
- Vendor Directories With Sorting By Vendor Code, Name, Or Territory
- Aging Reports With 7 Customized Columns
- Unlimited # Of Vendors
- Mailing Labels • 3 Year Vendor History For CRT Inquiry And Printing
- Flexible Payment Calendar
- Automatic Forecasting of Purchases
- Unlimited Allocations Per Invoice
- Up To 10 Invoices Paid Per Check

Inventory

- Supports Average, Last Purchase, And Standard Costing Methods • Physical Inventory
- Accepts Any Measure Units Per Case Like Fractions/Dozens/Gross/Etc
- Automatic Changing Of Costing Methods
- Time And Product Inventory
- 3 Year Product History In Units, Dollars, Cost, And Profits
- Automatic Forecast Of Product Sales
- Automatic Pricing Assignments
- Alert And Activity Reports With 11 Sorts
- CRT Shows On-Hand/On-Order/Committed/Sales/Cost/Profit/Turns/GROI

Purchase Order

- Allows Up To 99 Lines Per Purchase Order
- Per Line Discount In %
- Purchase Order Accepts Generic Discounts/Freight/Taxes/Insurance
- Purchase Order Accepts Back Orders & Returns
- Purchase Journal
- Automatic Interfacing With General Ledger, Payables, And Inventory

Billing

- Invoicing On Plain Or Pre-Printed Forms
- Prints Sales Journal
- Automatic Updating Of Committed Products In Inventory
- Ability To Customize Invoice For Remarks
- Allows Return Credit Memo
- Interfaces With Inventory, Accounts Receivable And General Ledger

Forecasting

- Unique program that automatically forecasts using your 3 year history
- Forecast Revenue And Expense Accounts
- Forecast Vendor Purchases
- Forecast Customer Sales, Cost, And Profit By Customer Or Salesperson
- Forecast Inventory Item Usage By 4 Automatic Methods
- Forecast By Same As Last Year, Or % Base From Last Year, Or Trend, Or Least Square Trend Line Analysis Method

Minimum Hardware Requirements

128K memory, one 5 1/4 DSDD floppy disk, 132 column printer, 80X24 CRT, MS-DOS, PC DOS 2.0 or later.

Runs on your: IBM (PCjr/PC/XT/AT), AT&T, EPSON, TANDY (1000/1200/2000), TI, COMPAQ, CORONA, SANYO, COLUMBIA, ETC.*

*(Computer names are tradenames and/or trademarks of their respective manufacturers)

To Order Call Toll Free:

1-800-431-0800

ASK FOR OPERATOR 301

For More Info Call:

(214)458-0038

Money-Back Guarantee: Before you spend thousands of dollars on an accounting system, try **dac-easy accounting**, and if you are not fully satisfied, return it. For $49.95 you owe it to yourself to find out that software doesn't have to be expensive to be the best.

dac software, inc. 5580 Peterson, Suite 130, Dallas, TX 75240

$49.95 plus $7.50 postage and handling Texas residents add 6 1/8 % sales tax ($3.06) Credit card members can order by phone. Enclose check or money order with coupon. $7.00 for C.O.D.

☐CHECK ☐MONEY ORDER ☐COD ☐VISA ☐MASTERCARD ☐AMEX

ACCOUNT NO._____ EXPIRES_____

Name

Address

City State Zip

Phone Signature PCW 301

Circle 33 on reader service card

You know that choosing the right software is serious business. So does WATCOM.

So before you make any decisions about your software needs, talk to WATCOM—the people major software users around the world have trusted for years.

WATCOM has the products you need to get the job done right. Proven performers like WATFOR*, WATFIV*, WATBOL*, and SCRIPT. Plus new leaders in software for PC workstations and micro-to-mainframe communications. Networks, language interpreters and compilers. Text preparation and data management. All WATCOM products are human engineered to provide the optimum in people efficiency and productivity. And they're designed to run compatibly on IBM mainframes and PC's, Digital mainframes and micros, and Commodore micros.

Whatever you need is backed up by WATCOM's innovative maintenance and support services. You'll be kept up to date with the latest in product enhancements and information. And our publications and seminars will help you get the most out of your software investment.

WATCOM. Quality products. Professional service. And a reputation built on more than 150,000 licensed mainframe and micro software programs throughout the world. So talk to us before you decide. After all, choosing the right software is serious business. For you. And for WATCOM.

Make the right choice: WATCOM INTERPRETERS

Excellent error diagnostics make WATCOM Interpreters the right choice in software for efficient program development in APL, BASIC, COBOL, FORTRAN, or Pascal.

WATCOM Interpreters emphasize error detection so that program corrections are more easily executed. Hard-to-find errors can be quickly located with the integrated debugging system for COBOL, FORTRAN, and Pascal. And programs can be efficiently entered and corrected with the integrated full-screen editor in all languages but APL.

WATCOM Interpreters are available for IBM PC, IBM 370 VM/SP CMS, and Digital VAX VMS*.

Make the right choice. Call or write WATCOM today and we'll tell you all about WATCOM Interpreters or any of WATCOM'S other people-efficient products.

WATCOM

The right choice in software.

nt to make the right choice in software. Send me more information on: ☐ WATCOM INTERPRETERS ☐ WATCOM Software Catalogue

Name:_____

Company:_____

Title:_____

Address:_____

City:_____ State:_____ Zip:_____

WATCOM PRODUCTS INC.
415 Phillip Street
Waterloo, Ontario, Canada
N2L 3X2
(519) 886-3700
Telex 06-955458

*WATFOR, WATFIV and WATBOL are registered trademarks of the University of Waterloo.
*IBM PC and IBM 370 VM/SP CMS are registered trademarks of International Business Machines Corporation.
*VAX, VMS are registered trademarks of Digital Equipment Corporation.

Circle 45 on reader service card

```
10 DEFINT A-Z:CLS:KEY OFF:DEF FNHEX(X$)=VAL("&h"+X$)
20 LOCATE 3,1:PRINT "X-Maker":READ F$
30 LOCATE 5,1,1:PRINT "Now testing for data errors...please wait";
40 SUM=0:READ LN:IF LN<0 THEN 80
50 READ H$:IF VAL(H$)<0 THEN 70
60 SUM=(SUM+FNHEX(H$))*2:SUM=(SUM\256)+(SUM MOD 256):GOTO 50
70 READ CKSUM$:IF SUM=FNHEX(CKSUM$) THEN 40 ELSE GOTO 170
80 RESTORE:CLS:LOCATE 3,1:PRINT "X-Maker":READ F$
90 LOCATE 5,1,1:PRINT "Press any key to create ";F$;": ";
100 A$=INPUT$(1):PRINT:IF A$=CHR$(27) THEN END
110 LOCATE 6,1:PRINT "Working...";
120 OPEN F$ AS #1 LEN=1:FIELD #1,1 AS BX$
130 READ LN:IF LN<0 THEN 160
140 READ H$:IF VAL(H$)<0 THEN READ CKSUM$:GOTO 130
150 LSET BX$=CHR$(FNHEX(H$)):PUT #1:GOTO 140
160 CLOSE:PRINT:PRINT F$;" has now been created.":END
170 PRINT:PRINT "Error in DATA line";STR$(LN);". ";
180 PRINT "Check your work.":BEEP:END
1000 DATA "a:datenow.com"
1010 DATA 1,BB,82,00,8A,0F,80,F9,55,75,03,E8,5E,00,BA,5F,01,-1,28
1020 DATA 2,B8,00,3D,CD,21,72,3E,A3,59,01,8B,1E,59,01,BA,5B,-1,67
1030 DATA 3,01,B9,04,00,B4,3F,CD,21,72,2B,0B,C0,74,27,8B,1E,-1,6B
1040 DATA 4,59,01,B4,3E,CD,21,72,1D,8A,2E,5B,01,8A,0E,5C,01,-1,DD
1050 DATA 5,8A,36,5D,01,8A,16,5E,01,B4,2B,CD,21,3C,FF,75,03,-1,73
1060 DATA 6,B8,0F,00,CD,20,B4,4C,CD,21,00,00,00,00,00,00,41,-1,12
1070 DATA 7,3A,5C,44,41,54,45,2E,44,41,54,00,B4,2A,CD,21,88,-1,FA
1080 DATA 8,2E,5B,01,88,0E,5C,01,88,36,5D,01,88,16,5E,01,BA,-1,0A
1090 DATA 9,5F,01,B8,00,3C,B9,20,00,CD,21,72,18,BA,5B,01,B9,-1,1C
1100 DATA 10,04,00,8B,D8,B8,00,40,CD,21,72,09,B8,00,3E,CD,21,-1,49
1110 DATA 11,72,02,CD,20,B8,00,4C,CD,21,00,00,00,00,00,00,00,-1,64
1120 DATA -1
```

DATENOW.BAS: Program X-MAKER.BAS configured to create DATENOW.COM

displays the message 'Insert COMMAND.COM disk in drive A: and strike any key when ready'. This can be annoying to experienced users and baffling to novices.

Fortunately, there is a simple way to prevent the problem. Before you compile the Turbo Pascal program, select item A from the Options menu to change the maximum amount of dynamic memory. Change the default value of 4000 (hex) paragraphs, which is 256K, to 400 (hex), which is 16K. Unless your program deals with huge dynamic variables or array parameters, it will run properly, and DOS won't need to reload COMMAND.COM afterward.

Michael Covington
Athens, Georgia

*Join the *.* global exchange. We'll pay $25 to $100 for each item published. Send your personal computer discoveries to* Star-Dot-Star, PC World, *555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or The Source STE908. All published submissions become the property of* PC World.

Our competition hopes you won't read between the lines.

THE Desk Organizer™	SIDEKICK	SPOTLIGHT
FREE-FORM FILING SYSTEM		
• **FILES ANYTHING**—names, letters, projects, ideas. • **STORES** alphabetically, by date, or in outline form. • **CREATES INDEXES,** each with hundreds of notes. • **ACCESSES** notes and correspondence even while you run other software.	**NO** free-form storage. NO	Filing limited to index-card-size entries.
COMPLETE SYSTEM OF TOOLS		
• **FORMULA CALCULATOR**—up to 26 variables. • **VISUAL CALCULATOR**—with electronic paper tape. • **INTELLIGENT PHONE DIALER**—automatically inserts & dials access codes. • **TIME MANAGEMENT**—visual calendar—detailed appointment notes. • **ALARM CLOCK**—unlimited chimes & visual signal. • **FULL CORRESPONDENCE CAPABILITY**—stores, edits, and prints notes and letters. • **RUBBER STAMPING FACILITY**—tags notes with time, date, etc. • **25 BUILT-IN BUSINESS FORMULAS.** • **25 BUILT-IN BUSINESS FORM LETTERS.** • **AREA CODE DIRECTORY.**	**NO** formula calculator. **NO** paper tape with calculator. **NO** intelligent dialing. **NO** detailed appointments. **NO** clock or alarms. **NO** correspondence storage. **NO** rubber stamps. **NO** formulas. **NO** form letters. **NO** area code directory.	**NO** formula calculator. **NO** paper tape with calculator. **YES.** Phone dialer. **NO** detailed appointments. **YES.** Alarm clock. **NO** correspondence storage. **NO** full-screen editing. **NO** rubber stamps. **NO** formulas. **NO** form letters. **NO** area code directory.
INTEGRATION OF FUNCTIONS		
• **ALL TOOLS WORK TOGETHER**—All information is shared automatically or can be transferred instantly between tools. • **ALL TOOLS USE FREE-FORM STORAGE.** • **ALL TOOLS ARE FULLY USER-TAILORABLE.** • **NOTES**—can be filed as appointments, or attached to calculations, reports or other notes. • **TELEPHONE DIALER**—searches file for phone number then dials. • **ALARM CLOCK**—triggers note recall when appointment comes up on calendar.	**NO** integration. NO	**NO** integration. NO
CONCURRENCY		
• **META**—co-resides in memory with other programs. • Full one-touch program switching. • Appointments chime through other applications.	**LIMITED.** Will not chime through other applications.	**LIMITED.** Must load and quit from each function each time.

One look tells you that THE DESK ORGANIZER® is a clear winner over competing desk management products. And there's more to our superiority than immediately meets the eye.

THE DESK ORGANIZER is the only powerful desk management program that features dynamic storage/retrieval capabilities. THE DESK ORGANIZER stands ready to help you organize yourself, your work, you name it.

At the core of THE DESK ORGANIZER is a free-form filing system that files anything you want, just by typing it. Notes. Letters. Reports. Phone numbers. Names and addresses. And you can retrieve or update at any time.

Surrounding this system is a powerful set of tools that provides one convenient environment for storing and utilizing all your work. Feature by feature, from alarm clock to telephone dialer, from visual calendar to visual calculator, all THE DESK ORGANIZER's amazing tools work together—even alongside other software. So they're always available to organize your busy day. Imitators of THE DESK ORGANIZER offer fewer functions that can't team up.

Put the most powerful desk management program on your side. Boot THE DESK ORGANIZER up each morning and be more productive all day long. More organized—down to every last detail.

We encourage you to read between the lines—and make the intelligent choice. THE DESK ORGANIZER. The superior electronic secretary for only $195. See your software dealer or call

WARNER SOFTWARE AT (212) 484-3070.

Warner Software, Inc.
666 Fifth Avenue
New York, N.Y. 10103
A Warner Communications Company

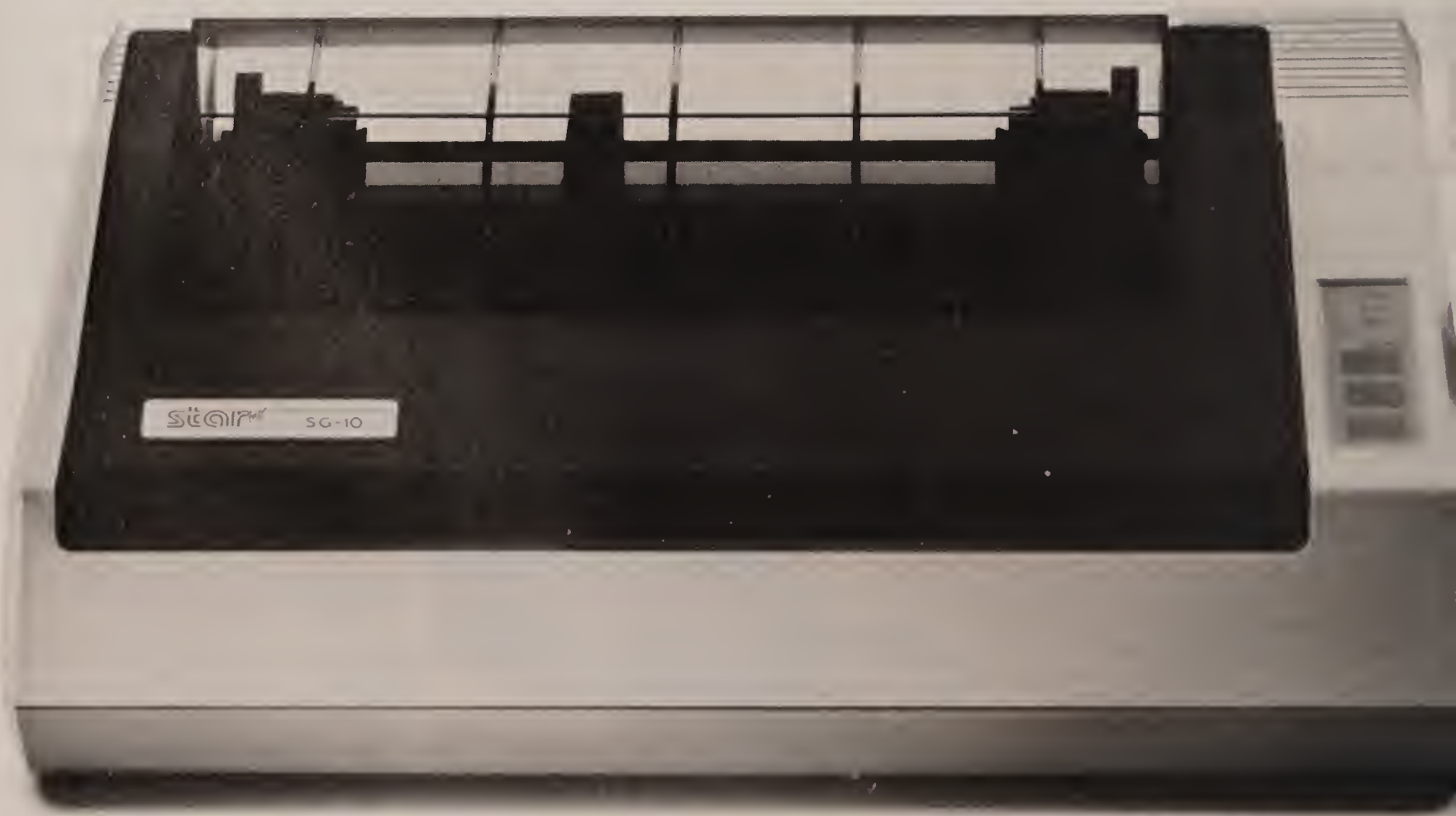
Runs on IBM PC, XT, AT, PCjr; Compaq, AT&T and other compatibles.

THE DESK ORGANIZER. THE ONLY COMPLETE DESK MANAGEMENT SYSTEM.

The Desk Organizer™ is a registered trademark of Conceptual Instruments Company. Sidekick™ is a registered trademark of Borland International Inc. Spotlight™ is a registered trademark of Software Arts.

Circle 196 on reader service card

STAR'S NEW PRINTERS WORK 20% FASTER. COST 20% LESS. ARE 100% CERTAIN TO CHANGE YOUR MIND ABOUT PRINTERS.



This new dual-mode SG-10 is only $299

No printer could be more appealing than one you design yourself.

And, in effect, that's what you've done.

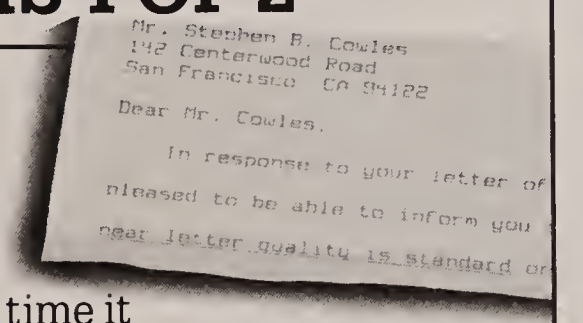
The new "S" series printers from Star Micronics have been designed not to our specifications, but to yours. With values that confound our accountants but will make great sense to you.

These printers are faster than ever. More compatible and reliable. With more added in and fewer add-ons.

And yet they cost *less*.

Don't try to figure it out. Just enjoy.

NLQ IS 1 OF 2



Because we've increased our printing throughput by 50%, you can now finish 6 pages in the time it used to take to print 5. And even though we've upped our speed, we've kept up our quality.

In fact, on three of our new models, both draft *and near-letter-quality* are standard (no extra charge). A fourth model, the SB-10, prints draft *and letter-quality* standard (again, not extra).

So now, with just *one* printer, you're ready for data processing and word processing. That's like owning two printers for the price of just one.

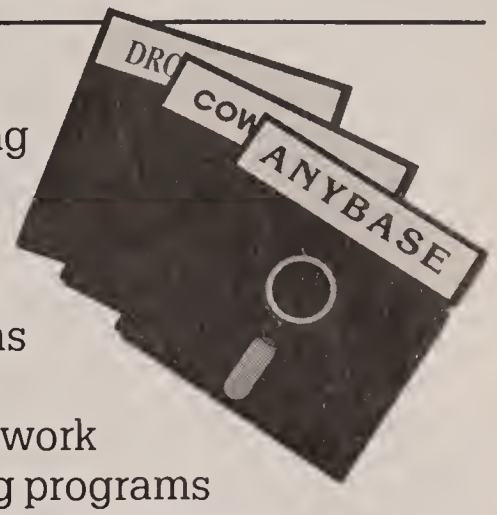
GET ON LINE BY JUST PLUGGING IN

The new Star "S" series printers are fully compatible with even the most fickle of personal computers.

And they're especially friendly with IBM®-PC, Apple,® Commodore,® and all compatibles.

In most cases, hooking up is no more complicated than putting a square peg in a square hole. But it's a lot more rewarding.

READY FOR ANY SOFTWARE



The new "S" series printers make printing as easy as 1-2-3.™ Which is just one example of the many spreadsheet programs they're ready for.

The new Stars can work with word processing programs like WordStar.® Educational software like Dr. Logo.™ And even the new integrated formats like Framework™ and Symphony.™

So Star printers match hardware to software without disk-driving you crazy.

They handle many functions faster. They're more compatible. Less expensive. More reliable. And have a full year warranty. "S" series printers have been designed with so many of your needs in mind, it's as if you'd done it yourself.

And what a great job you did.

For a free demonstration, visit your local Star dealer.

SD-10 types draft and NLQ, just $449.

SR-10 prints 200 cps for only $649.

SR-15 includes 16K memory for spreadsheets, $799.

star™

THE POWER BEHIND THE PRINTED WORD®

200 Park Avenue, New York, NY 10166
Chicago, IL (312) 773-3717 • Boston, MA (617) 329-8560
Irvine, CA (714) 586-8850

Prices shown are manufacturer's suggested retail prices.

Circle 319 on reader service card

PC NETWORK

BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%, AND GET 14-30 DAY SOFTWARE RENTALS†...

In just the last few months, *The NETWORK* has saved its members more than $24,000,000 and processed over 100,000 orders.

Listed below are just a few of the over 20,000 products availa at our EVERYDAY LOW PRICES! All software below is priced IBM-PC format.

The nation's largest corporations depend on PC NETWORK!

On our corporate roster are some of the nation's largest financial industrial and professional concerns *including some of the most important names in the computer industry:*

AT&T	*General Motors*
Barclays Bank	*Gillette*
Bell & Howell	*Hewlett Packard*
Citibank	*Hughes Aircraft*
Columbia University	*IBM*
Data General	*ITT*
Exxon	*Kodak*
Farm Bureau Insurance	*Multimate*
Frontier Airlines	*United Nations*
General Mills	*Yale University*
General Electric	*Veteran's Administration*

plus thousands of satisfied consulting firms, small businesses, user groups, municipalities, government agencies and value-wise individuals ACROSS THE NATION! Their buyers know that purchasing or renting from PC NETWORK saves them time, money and trouble. They also count on us for product evaluation, professional consultation and the broadest spectrum of products and brands around.

CALL TOLL FREE
1-800-621-S-A-V-E

In Illinois call (312) 280-0002

Your Membership Validation Number: W255

You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD or AMERICAN EXPRESS. Our knowledgeable service consultants are on duty Mon.-Fri. 8 AM to 7 PM, SAT. 9 AM to 5 PM CST.

PERSONAL COMPUTER NETWORK
320 West Ohio
Chicago, Illinois 60610

Call now... Join the PC NETWORK and start saving today!

PRICING MADNESS

Once again, as Federal Express picks up our ad at the very last millisecond before this issue's advertising deadline, ***here we sit with dozens of price reductions and new product announcements which have arrived too late for us to let you know.***

Why, our ad manager asks, do we always go through a last minute price update frenzy, just seconds before our ad is due at the publisher, when we know that despite our heroic effort, ***many of these products will cost even less by the time you read this ad.***

How, she asks, can we get a crystal ball to forecast what fantastic promotions and specials our suppliers are going to offer from now to the date ***this ad gets to the newsstand over two months from today?***

Well, we decided that she has a good point. While we'll still keep getting our grey hairs and ulcers from last minute revisions, we will start publishing this notice and ask our readers to make a simple check. Look at any four back issues of this magazine *(yes we're in every one)* and track the prices on the most popular products. ***You will see that many drop with every issue.*** Most of these price changes were instituted well before the issue was printed and ***our members always pay the lower price.*** This should prove that this notice is much more than hype.

Given the current madness in the PC industry with its spur of the moment pricing and instant product introductions, ***you will find it always pays to call for our latest prices.*** You will be glad you did.

GAMES & EDUCATIONAL SOFTWARE

(Please add $1 shipping and handling for each title ordered from below.)

	Wholesale
Bluebush *Chess (Your Toughest Opponent)*	$ 34.00*
Bluechip *Millionaire/Oil Baron or Tycoon*	34.00*
Broderbund *Lode Runner*	19.75*
CBS *Goren-Bridge Made Easy*	48.00*
CBS *Mastering the SAT*	81.00*
Epyx *Temple of Apshai*	21.97*
Infocom *Zork 1 or Witness*	21.50*
Infocom *Deadline, or Suspended*	27.00*
Microsoft *Flight Simulator*	27.00*
Mouse Systems *PC Paint-Turn your PC into A Color Macintosh!*	59.95*
Orion *JBird (OBert Look Alike)*	22.00*
Scarborough *Mastertype*	27.00*
Screenplay *Asylum (works with mono card too)*	$ 15.50*
Sierra On-Line *Frogger*	21.00*
Sierra On-Line *Crossfire*	18.00*
Sublogic *Night Mission Pinball*	24.00*
Spinnaker *Alphabet Zoo*	15.97*
Spinnaker *Delta Drawing*	24.97*
Spinnaker *Face Maker*	15.97*
Spinnaker *Hey Diddle Diddle*	15.97*
Spinnaker *Kinder Comp*	15.97*
Spinnaker *Rhymes & Riddles*	15.97*
Spinnaker *Story Machine*	15.97*
Spinnaker *Most Amazing Thing*	20.77*
Virtual Combinatics *Micro Cookbook*	21.00*

BUSINESS SOFTWARE

(Please add $2.50 shipping and handling for each title order from below.)

ATI *How to use Multimate*	$ 42.00*
ATI *How to use Microsoft Word*	42.00*
ATI *How to use Lotus 1-2-3*	42.00*
► **Ashton-Tate** *DBase III*	315.00*
► **Ashton-Tate** *Framework*	315.00*
Ashton-Tate *Friday!*	151.00*
Borland *Side Kick (Protected)*	26.00*
► **Central Point** *Copy II PC*	23.00*
Conceptual Instruments *Desk Organizer*	157.00*
Digital Research *CP/M-86*	33.00*
Digital Research *DR Logo*	57.00*
Digital Research *PL/I Compiler*	399.00*
Digital Research *Concurrent CP/M—Windows*	195.97*
Funk Software *Sideways*	36.00*
Harvard *Harvard Project Manager*	186.00*
Howardsoft *Tax Preparer 1985*	177.00*
► **Hayes** *Smartcom II—New VT100 Emulator*	68.00*
Human Edge *The Management Edge*	145.00*
Human Edge *The Sales Edge*	145.00*
Human Edge *Mind Prober*	28.45*
Lattice *C Compiler*	310.00*
► **Lotus Development** *Lotus 1-2-3*	265.00*
Lotus Development *Symphony*	CALL
MicroRim *RBase 4000*	$230.00*
Microsoft *C Compiler*	275.00*
► **Microsoft** *Word—Latest Version 2.0*	205.00*
Microsoft *Multiplan*	105.00*
Monogram *Dollars & Sense*	CALL
► **Multimate** *Multimate (Latest Version)*	239.00*
Oasis *The Word Plus*	90.00*
Open Systems *P/O Sales A/R INV G/L A/P Team Mgr*	370.00* es.
Real World *G/L A/P A/R P/R or OE/INV*	387.50*
Rosesoft *Prokey Version 3*	74.00*
Ryan McFarland *RM COBOL (Dev System)*	570.00*
Samna *Samna III Word Processor*	325.00*
Satellite Software *WordPerfect*	215.00*
Softcraft *Fancy Fonts*	125.00*
Softstyle *SET-FX*	35.00*
Software Publishing *PFS: File*	72.00*
Software Publishing *PFS Report*	64.00*
Software Publishing *PFS Write*	72.00*
Software Publishing *PFS Graph*	72.00*
TCS *Total Ledger*	440.00*
Verbatim *Desk Drive Analyzer*	25.00*

HARDWARE

(Please add shipping and handling charges found in italics next to price.)

COMPLETE SYSTEMS

Apple *Macintosh Base System*	CALL	
Apple *Apple IIc*	CALL	
Apple *Apple IIe*	CALL	
Columbia *Desktop & Portable Systems*	CALL	
► **COMPAQ** *Hard Disk Portable 10MB Hard Disk/1 Floppy/256K*	2,735.00*	(59 08)
DATA General *DG ONE 128K/1 Drive "The Real Portable"*	1,999.00*	(43 20)
Eagle *Desktop PC and Spirit Portables*	CALL	
► **IBM** *PC Base System 2DSDD/FDC/256K*	1,495.02*	(32 55)
► **IBM** *PC Professional Hard Disk*	1,962.52*	(42 87)
Compaq *All Models*	CALL	
IBM *PC/AT All Configs*	CALL	
Sanyo *MBC 550 "Lowest Cost Compatible"*	620.00*	(13 39)
► **Sanyo** *MBC 775 Color Portable IBM Clone 2 Drives/Color Monitor/256K*	1,775.00*	(38 00)
Texas Instruments *Professional*	CALL	

DISK DRIVES & CONTROLLERS

► **PC Network** *10MB INTERNAL 1/2 Height Autoboot Drive New lower price Drives by Fujitsu/Cogito/Shugart*	$ 545.00*	(12 00)
► **MMI** *3" 10MB Low Power Winchester Mounts Like Half Height Drive*	615.00*	(13 50)
Maxtor *140MB External Auto Booting Drive with Controller for PC*	4,900.00*	(106 00)
Maxtor *140MB External Auto Booting Drive for AT*	4,600.00*	(106.00)
Maynard *Floppy Disk Controller*	92.00*	(2 50)
Maynard *WS-1 10MB Internal Hard Disk*	770.00*	(18 15)
Maynard *WS-2 same as WS-1 but with Sandstar Floppy Controller (uses 1 slot)*	930.00*	(20 30)
Maynard *Floppy Controller/Serial Port*	145.00*	(2 50)
► **Panasonic** *Half Height DSDD Drive Pair*	160.00*	(3 10)
► **PC Network** *Half Height Drive Pairs Our Volume Lets us Import These Name Brand Drives Directly from the Source*	145.00*	(2 48)
► **Tandon** *TM 100-2 Full Height DSDD Drive*	102.00*	(2 20)
Tallgrass *25MB External Hard Disk with 60MB Tape Backup*	2,445.00*	(46 44)
Teac *FD 55-B Half Height DSDD Drive Pair*	225.00*	(5 29)

MEMORY CHIPS

All chips guaranteed for life

► **64K Memory Upgrade Kits** *(9 chips)*	$ 15.21*	(1 00)
► **64K Dynamic Ram Chips** *(Each)*	1.69*	(1 00)
► **256K Dynamic Ram Chips** *(Each)*	13.00*	(1 00)
► **128K AT Mother Board Chips** *(Each)*	16.00*	(1 00)

MODEMS

Anchor *Mark XII LOWEST PRICE 1200BPS HAYES COMPATIBLE EXTERNAL MODEM!*	$ 230.00*	(5 00)
Anchor *Volksmodem 300*	47.00*	(1 00)
Hayes *Smartmodem 1200B with new Smartcom II VT100 Emulator*	325.92*	(2 50)
Prometheus *Promodem 1200 External 100% Hayes Compatible*	279.00*	(6 00)
U.S. Robotics *Password (Compact 1200BPS External)*	240.00*	(5 60)

MONITORS

Amdek *Video 300G Composite Green*	$ 110.00*	(3 00)
Amdek *Video 300A Composite Amber*	120.00*	(3 00)
Amdek *Video 310A IBM Type Amber*	130.00*	(3 00)
Amdek *Color 300 (NEW!) Composite*	215.00*	(4 64)
Amdek *Color 600 (NEW!) High Res RGB*	395.00*	(8 53)
Amdek *Color 700 (NEW!) Ultra High Res*	455.00*	(9 83)
Amdek *Color 710 (NEW!) 700 w/Non Glare/Long Phosphor*	485.00*	(10 48)
Princeton *HX-12 RGB Monitor*	CALL	
Princeton *MAX-12 IGB Mono*	CALL	
Princeton *SR-12 Ultra High Res RGB*	CALL	
► **Quadram** *Quadchrome II NEW 640x200 RGB w 14" Screen Black Phosphor Mask IBM Case*	370.00*	8 21
► **Samsung** *12" TTL IBM Type Amber A great looking performing monochrome from the manufacturer of IBM's own color monitor*	89.50*	(5 00
Taxan *420 Super High Res RGB Monitor*	380.00*	(8 21)
Taxan *440 Highest Res RGB (720x400) Currently Available Works With Persyst Bob Card*	525.00*	(11 34)
Zenith *ZVM-123 Green High Res (Consumer Reports Rated Best Buy!)*	76.00*	(2 50)

MULTIFUNCTION CARDS

Apparat *256K Memory Board with 64K*	$ 81.00*	(1 75)
Apparat *Combo II w/ser/par/game/clock/strw*	115.00*	(2 48)
Apparat *AT Ram Expansion card*	136.00*	(2 50)
AST *Six-Pack Plus with 64K*	229.00*	(2 50)
AST *I/O Plus II*	120.00*	(2 50)
AST *Advantage for AT*	CALL	
► **EVEREX Magic Card/64K** *Full Six Packs features—Game Port included Extra Software*	160.00*	(2 50)
► **ORCHID** *BLOSSOM W/64K*	200.00*	(2 50)
Quadram *Improved Quadboard w/OK*	199.00*	(2 50)
Tecmar *Captain Multifunction Card O/K*	195.00*	(2 50)

PRINTERS

C. Itoh F10/40 *Starwriter 40 CPS LD*	875.00*	(18 90)
C. Itoh *Prowriter 8510 AP*	285.00*	(6 16)
Comrex *CR420 420 CPS DP/LO Printer From the Epson Organization*	1,533.00*	(33 12)
► **Epson** *LX-80 100CPS 80 COL LO Mode —New Model!!*	225.00*	(4 90)
► **Epson** *FX-80*	365.00*	(7 88)
► **Epson** *FX-100+*	520.00*	(11 23
Epson *LO1500*	CALL	
Epson *IBM-to-EPSON Parallel Cable*	21.00*	(1 00)
► **NEC** *2030 20CPS LO Parallel*	615.00*	(13 50)
► **NEC** *2050 20CPS Letter Quality Printer*	615.00*	(13 50)
► **NEC** *3530 33CPS LQ Parallel*	1,150.00*	(24 84)
► **NEC** *3550 33CPS Letter Quality Printer*	1,222.00*	(27 22
► **NEC** *8850 55CPS LO New Model IBM Version*	1,590.00*	(35 64
► **Okidata** *ML 182 New 120CPS LO Model FRICT/IBM Graphics + more*	200.00*	(4 34
► **Okidata** *NEW! Color 20 80CPS 100+ Colors LO Model IBM Graphics! + More (Requires Interface*	109.00*	(2 35
► **Okidata** *NEW! IBM Interface for Okimate color 20*	69.00*	(1 50
► **Okidata** *ML84P 200CPS 132 Col*	620.00*	(13 40)
► **Okidata** *ML92P 160CPS 80 Col Printer*	350.00*	(7 56)
► **Okidata** *ML93P 160 CPS Wide Platen*	550.00*	(11 88)
► **Okidata** *2410P Pacemaker 350CPS*	1,640.00*	(35 42)
► **Okidata** *IBM-to-Okidata Parallel Cable*	20.75*	(1 00)
Ouma *Sprint 11/40 40CPS Letter Quality*	1,155.00*	(24 00)
Ouma *Sprint 11/90 90CPS Letter Quality New! Fastest Daisywheel Out!*	CALL	
Ouma *IBM Cable and Interface (required)*	72.00*	1 00
► **Silver Reed** *EXP 400 10CPS Letter Quality*	230.00*	4 99
► **Silver Reed** *EXP 500 18CPS Letter Quality*	280.00*	6 05
Texas Instruments *855 DP/LO w/Tractor*	716.00*	(15 50)
Toshiba *P-1340 80 Col Version of P-1351*	696.00*	(15 03)
Toshiba *P-1351 160/100 CPS Draft/LO LO Printer*	1,200.00*	(25 92)

VIDEO CARDS

Hercules *Color Card w/Parallel Port*	$ 148.00*	(3 20)
► **Hercules** *Monochrome Graphics Cards*	273.00*	(2 50)
Paradise *New Modular Multidisplay Card*	255.00*	(2 50)
Persyst *Bob Card Ultra High Res Color Card with Mono Quality Text in Color*	365.00*	2 50
► **STB** *Graphix Plus II NEW! (simultaneous Mono Graphics & Color)*	235.00*	(5 00)

ACCESSORIES AND SUPPLIES

► **Brand Name DSDD Diskettes** *Guaranteed for Life Not Generic*	$ 14.00*	1 00
Curtiss *PC Pedestal II*	32.50*	2 50
► **PC Network** *Replacement 130 Watt IBM-PC Power Supply— Gives your PC (Old or New) the same capacity as an XT Good for add in tape drives without need for a piggyback unit) and large capacity disk drives*	165.00*	3 56
SMA *PC Documate Keyboard Templates for Lotus/DBASE Multimate and others Each*	9.99*	(1 00)
WP Printer Paper *2600 Sheets Microline Perfs (invisible when torn)*	17.00*	(10 00)

***PC NETWORK Members pay just 8% above the wholesale price, plus shipping.** All prices reflect a 3% cash discount Minimum shipping $2 50 per order Personal checks please allow 10 working days to clear

†RENT BEFORE YOU BUY — Members are eligible to join The NETWORK's Business and Game Software Rental Libraries and evaluate products for a full 14 (Regular) or 30 (VIP) days to see if it meets your needs And The NETWORK's rental charges are far less than other software rental services — JUST 20% OF THE MEMBER WHOLESALE PRICE. **We feature over 1,000 available titles in IBM Apple MAC and CP M Formats.** Hardware prices highlited by ► reflect recent major price reductions

JOIN BY THE FOURTH OF JULY AND GET ONE OF THE FOLLOWING FREE or SPECIALLY PRICED ITEMS

With any Regular Membership choose one of the following:

Get One *FREE* Diskette

- Buy a **Copy II PC** for **$16.00*** ***(2.50)*** and be able to back up your protected software.

With Any VIP or Regular Business Rental Membership choose one of the following:

- Buy a 64K Memory Upgrade Kit for **$5.00*** ***(1.00)*** (Limit 1 set)
- Buy a Box of Diskettes for **$10.00*** ***(1.00)*** (Limit 10 boxes)
- Buy a copy of **Borland's *Sidekick*** for **$20.00*** ***(2.50)*** (Limit 1)
- Get a ***FREE*** rental of any title in our GAME library!!

With Any VIP Rental Membership: Choose any one of the above or one of the following:

- Get ***50% off*** the rental of any title in our BUSINESS library!!
- Buy an Autobooting 1/2 height 10mb Hard Disk upgrade for an IBM PC with drive, controller, cables and instructions— 1 year warranty for **$500.00*** ***(11.00)*** (Limit 1)
- Get a ***FREE*** box of 10 diskettes ***(1.00)***
- Buy one 64K Memory Upgrade at the normal price and *buy 1 set for* ***$1.00*** (Limit 1)

THIS IS JUST THE BEGINNING OF YOUR SAVINGS AS A NETWORK MEMBER!!

**You pay this price under the terms of this limited time offer. You must be a new member and join by July 4, 1985. You may place your order for the above at the time you join or you will receive a certificate redeemable at any time while you are a member for the special prices/giveaway merchandise listed above... All prices reflect a cash discount card users add 3%, make sure to add the shipping charges shown in parenthesis next to item when you order... Happy Computing!*

PC NETWORK • MEMBERSHIP APPLICATION

YES! Please enroll me as a member in the PC NETWORK™ and send my catalog featuring thousands of computer products, all at just 8% above DEALER WHOLESALE PRICES. I will also periodically receive "THE PRINTOUT", a special up-date on merchandise at prices BELOW even those in my wholesale catalog, and all the other exclusive, money-saving services available to Members.

I am under no obligation to buy anything. My complete satisfaction is guaranteed. ☐

Please check (✓) all boxes that apply: **W255**

● Basic Membership
With 14 Day Rentals

☐ One-year membership for $8
☐ Two-year membership for $15 (SAVE $1)
☐ Business Software Rental Library for $25 add'l. per year—members only
☐ Games Software Rental Library for $10 add'l. per year—members only

● Special V.I.P. Membership
With 30 Day Rentals

☐ One-year membership for $15
☐ Two-year membership for $25 (SAVE $5)
☐ BOTH Business and Game Software Rental Libraries for $30 add'l. per year—V.I.P. members only

☐ Bill my credit card: ☐ VISA ☐ MasterCard ☐ American Express

Account Number: _____ Exp. Date _____ mo. year

☐ Check or money order enclosed for $ _____.

Name _____

Address _____ Apt. No. _____

City _____ State _____ Zip _____

Telephone (_____) _____

My computer(s) is: ☐ IBM PC ☐ IBM-XT ☐ IBM-AT ☐ Apple II ☐ Macintosh ☐ Other _____

Signature ✓ _____

(Signature required to validate membership) Copyright © 1985, PC NETWORK INC.

GET *THE NETWORK* ADVANTAGE!!

DARE TO COMPARE
—SEE WHY OVER 60,000 HAVE JOINED
—MAKING US THE NATION'S #1 SOURCE
FOR EVERYTHING IN COMPUTING...

- ***Our 600 Page Wholesale Catalog***
  Over 20,000 products priced at Wholesale + 8%.
  Anything you will ever need at a consistent low price...
- ***Quarterly Updates***
  Your Catalog is ***never obsolete****! Keep on top of the newest products and latest price changes.*
- ***The Printout***
  Our newsletter gives you fantastic specials along with unbiased analysis of new products and industry trends.
- ***10 Day Returns on any Hardware!!***
  If you don't like any hardware product—for any reason—return it for a refund.
- ***1000 + Title Rental Library***
  14 to 30 day rentals on over 1000 different titles.
  Try before you buy!!
- ***Low Freight—No hidden Charges***
  We don't use hidden charges or inflated shipping, handling and insurance fees to make our prices seem lower than they are...
- ***And Much Much More!***

SEE REVERSE FOR A LIMITED TIME OFFER!!!

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 14823 Chicago, IL

POSTAGE WILL BE PAID BY ADDRESSEE

PC NETWORK
320 West Ohio
Chicago, Illinois 60610

COMPLETE IBM™ PC SYSTEMS

IBM PC BASE SYSTEM
IBM PC w/256K — **$1,495.02*** *(32.55)*
Floppy Drive Controller
2 Double Sided Double Density 320/360K Disk Drives
The Base System is your lowest cost starting point for configuring the exact system of your choice. Combine it with any of the monitors, video cards, multifunction cards and accessories listed in this ad, and prove the Network can't be beat as your system source.

IBM PC PROFESSIONAL HARD DISK SYSTEM
IBM PC w/256K — **$1,962.52*** *(42.87)*
Floppy Drive Controller
1 Double Sided Double Density 320/360K Disk Drive
w/Half Height Disk Subsystem.
Half Height 10MB Drive Allows Room for Addition of Tape Backup in PC!
1½ times faster than XT
Automatic Hard Disk Boot Feature.

CALL FOR LATEST IBM ANNOUNCEMENTS

CUSTOM CONFIGURATIONS WELCOME

This system increases productivity in any business or professional situation. The 10Mb hard disk eliminates cumbersome floppy disk changes, simplifies operations and dramatically speeds program execution time. The NETWORK's buying power provides you with better than XT performance at a price lower than you'd expect to pay for a standard PC.

***PC Network Members pay just 8% above this wholesale price plus shipping. These prices have been prepared in February, 1985 and may have been changed with new product announcements. Call for latest prices.**

COMPAQ™ HARD DISK SYSTEM (+)

PROFESSIONAL PORTABLE HARD DISK SYSTEM
COMPAQ w/256K — **$2,735.00*** *(59.08)*
Floppy Drive & Controller
Integral dual mode monitor
Shock Mounted 3" *10MB Auto Booting Hard Disk.*
PC Network goes the COMPAQ + one better building a newer technology ½ height low power consumption hard disk into the standard COMPAQ. Mounted with a ½ height floppy drive in the space of 1 Conventional full height unit, you have expansion available to add up to 2 additional hard disk, tape or floppy drives in your portable, just like the Desk Pro. All for about what you would pay for the standard 2 floppy portable.

FEATURED PRODUCTS!

64K MEMORY EXPANSION KITS ..... $ 15.21*
Set of 9 chips *Guaranteed for Life.*

LOTUS 1-2-3 ..... 265.00*
New Best Price!

INTERNAL PC 10MB HARD DISK..... from 545.00*
Low Power Automatic Boot works on standard PC's. Includes drive/controller/cables/mounting hardware & instructions. Full one year warranty!
We use our clout with Brand Name suppliers like COGITO/MMI/Tandon/Fujitsu/Miniscribe/Shugart and others to bring you the best products at the Lowest Price in the Business! Call on the brand of your choice.

½ HEIGHT DS/DD DISK DRIVES..... per pair from 145.00* (pr)
2 drives w/mounting hardware & complete instructions.
Just like our hard disks featured above. The Network buy's direct and makes fantastic deals with manufacturers like MPI/Tandon/CDC/Shugart/Qume/TEAC and others to bring you fantastic prices and Name Brand drives for your PC/AT/XT or Jr/or Compatible. *Yes, this price is for two drives!!*

OKIDATA NEW PERSONAL PRINTERS
Microline 182/120CPS/IBM Graphics/LQ Mode & More! + More! 200.00*
Okimate Color 20 80CPS/100 + Colors/IBM Graphics/LQ Mode + More! (Needs Interface) 109.00*

TANDON TM100-2 OR CDC FULL HEIGHT DRIVE 102.00*

EVEREX MAGIC CARD/64K 160.00*
Full six Pack Features—Game Port included Extra Software—Fantastic Price!!!

AMDEK V310A IBM TTL AMBER 130.00*

STB GRAPHIX PLUS II 235.00*
Both Mono and Color Card w/printer port. Run either Monitor type or both at once! Gives 16 Colors w/Lotus.

HERCULES COLOR CARD w/Printer Port 148.00*

HAYES 1200B with new Smartcom II/VT100 Emulator 325.92*

BRAND NAME DISKETTES 14.00*
DS/DD Box of 10 *Guaranteed for Life* *Not Generic*
**NETWORK members pay just 8% above these wholesale prices plus shipping*

CALL TOLL FREE 1-800-621-S-A-V-E (orders and memberships only)
In Illinois call (312) 280-0002 validation code W255

IBM and COMPAQ are registered trademarks of IBM and COMPAQ corporations.

PC NETWORK

. . . WITH THESE 15 UNIQUE BENEFITS

1 COST + 8% PRICING—The NETWORK purchases millions of dollars in merchandise each month. You benefit in receiving the lowest price available **and all at just 8% above published dealer wholesale price.**

2 OUR 600 PAGE WHOLESALE CATALOG—Members receive our 600 page wholesale catalog containing over 20,000 hardware and software products for the *IBM PC, APPLE* and over 50 other popular computer systems. **THE NETWORK'S CATALOG IS THE LARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY. NOW UPDATED QUARTERLY!**

3 IN-STOCK INSURED FAST HOME DELIVERY—The NETWORK maintains a **giant multi-million dollar inventory of most popular products,** allowing us to ship many orders from stock. Non-stock items are typically maintained in local warehouses just days away from The NETWORK and YOU. We pay all insurance expenses on your shipment. **EMERGENCY OVERNIGHT SERVICE IS AVAILABLE ON REQUEST.**

4 10 DAY RETURN POLICY—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.

5 MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with your membership within 30 days, we will refund your dues IN FULL.

6 EXPERIENCED CONSULTANTS—The NETWORK hires consultants, not order takers, to aid you in product selection. Our consulting staff possesses in excess of 150 man years of personal computer product experience. **We back our consultants with our money back guarantee: IF ANY PRODUCT RECOMMENDED BY OUR CONSULTING STAFF FAILS TO PERFORM AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE FOR A 100% REFUND.**

7 FREE TECHNICAL SUPPORT—The NETWORK supports every product it sells. Our qualified TECH-SUPPORT staff will help you assemble your system, interpret vendor documentation and get your software and hardware to work. **WE WILL GIVE YOU ALL THE HELP YOU NEED, WHEN YOU NEED IT—FREE!**

†8 OPTIONAL BUSINESS RENTAL LIBRARY—All members can join our BUSINESS RENTAL LIBRARY ***featuring over 1000 available titles*** for just $25 PER YEAR above the base membership fee. **This entitles you to rent business software AT JUST 20% of the DISCOUNT PRICE FOR A 14 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 30 DAYS for just $30 above the V.I.P. base fee. This also includes the game library privileges for a $5 combination savings.**

†9 OPTIONAL GAME SOFTWARE RENTAL LIBRARY—The Game Rental library is available to members for just $10 PER YEAR and permits evaluation (or just enjoyment) of any game or educational software product as above.

10 SPECIAL SAVINGS BULLETINS—THE PRINTOUT—Issued Quarterly at no charge to Network members only! The Printout contains all the New Product listings and price changes you need to keep your Catalog up to date. Also, we buy excess dealer inventories, and store bankruptcy closeouts, which we turn around and make available to our members at fantastic savings via *THE PRINTOUT.*

11 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

12 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

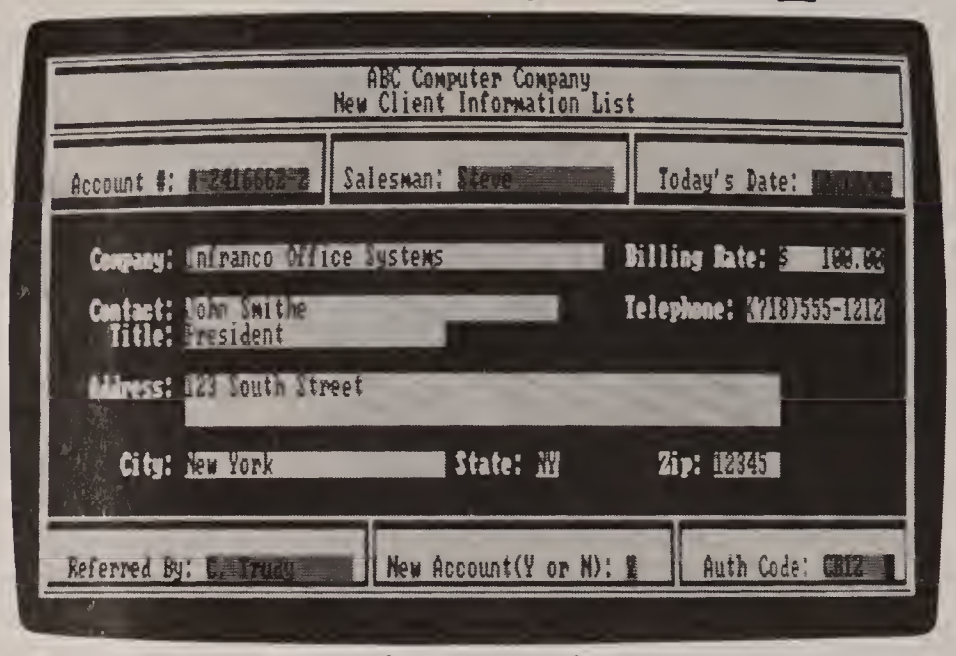
13 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users *(see opposite page left).* The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

15 PRICE PROTECTION—The PC Industry is crazy!! Prices change not yearly or monthly or even weekly but often day by day! These changes are sometimes up *but are mostly down!!!* **THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!**

Circle 460 on reader service card

As a programmer, you're already respected.



With better-looking screens, you could be loved.

You write wonderful programs.

Their logic is elegant. Their organization is solid. They work like a charm.

But how do they look?

Maybe appearance shouldn't count, but it does. Because not only is a well-designed screen impressive to look at—it also makes the program easier to work with. And that makes you look good, too.

It takes you days, perhaps weeks of effort to make a program right. Isn't it worth a few minutes to make it beautiful?

A few minutes. That's all it takes for you and Screen Sculptor to create a glorious-looking screen. And once it's done, Screen Sculptor automatically writes the program—**in IBM Basic, IBM Pascal, or Turbo Pascal**—to display the screen and allow the user to enter data.

There's no limit to what you can do with Screen Sculptor. Design a screen you like and rearrange it whenever you like. Select colors from a mouth-watering menu. Choose special characters, draw lines and boxes, paint in areas, repeat a character in any direction!

Specify input fields, variable names, data types, acceptable data ranges and more. Then Screen Sculptor generates actual program source code based on your screen design.

You'll need an IBM PC, XT, PCjr, PC AT or 100% compatible, 128K, DOS, one 320K disc drive and any 80-column display.

Screen Sculptor does more than design screens. For $125, it will enhance your creative reputation and thoroughly impress your users.

Because people don't expect a beautiful screen.

But they sure do appreciate it when they see it.

SOFTWARE BOTTLING COMPANY

Try it FREE for 30 days!

We're so sure you'll find Screen Sculptor indispensable that we make you this no-risk offer: Order now and you'll also receive a full demo disk. Use it and the manual for 30 days. Then, if you can bear to give it up, return the package for a full refund!

Credit card orders only call 24 hours a day, 1-800-824-7888, operator 268.

For all other orders and inquiries call or write: The Software Bottling Company of New York, 29-14 23rd Avenue, Long Island City, NY 11105. (718) 728-2200. If we're shipping to a NYS address, please add 8¼% sales tax.

Circle 862 on reader service card

How To Solve The Problems PCs Create In Two Words.

Back-Up!™

It's all you have to say when one of your PCs goes down.

We specialize in servicing business PCs. Particularly IBM-PCs. We also service your mixed brands of peripherals, too.

Our service is fast, flexible and economical. We use a range of service options to design a program that's right for your company. Fixed fee. Per-call. And our unique flexible fee, which can save you up to 70% over traditional maintenance contracts.

But no matter which options you choose, Back-Up gives you centralized support. So calling one number brings service to your company's PCs. Anywhere across the country.

Back-Up is just one of the ways we're using proven technology to solve computer maintenance problems worldwide. Call **1-800-346-6789** (in Minnesota 612/292-2209). Outside the U.S., call your local Control Data office. Wherever you are. Whenever you need us.

CONTROL DATA

5045 Copyright © 1985 Control Data Corporation

IBM-PC and IBM are registered trademarks of the International Business Machines Corporation

Circle 646 on reader service card

Are your PCs paying dividends... or collecting dust?

It's a legitimate question. You listened to all the promises about personal computers making your life so much easier. And you made the big investment.

Now your PC is just a diversion when you have time to spare. Or worse, it's collecting dust because you haven't learned how to put it to use.

Sound familiar? We have the answer. The **Boeing™ Tutorial Series.™**

With this computer-based series of tutorials, you can quickly increase your computer literacy and discover how to make your PC pay the dividends originally promised.

The series will show you the most useful new applications for PCs and will give you the facts you need to make the right software decisions. With our friendly, interactive courseware, you'll use your PC more effectively. And enhance your personal productivity.

Just take a look at what we offer:

An Introduction to Personal Computer Terminology. Are you incorporating microcomputers in your work? Feeling nervous because you don't know enough about them? Then this course is for you. It explains all the basics, from discs and screens to peripherals and security. You can't join the game if you don't know the terms. **$85.00** (Code: 1001)

Basic Data Base Concepts for Personal Computers. Will a data base management system help you do your job? Here's the course that can tell you. It offers an unbiased look at some of the most widely used data base management packages. You'll learn when a DBMS will help, when it won't, and how to evaluate which software best fits your requirements. **$60.00** (Code: 1002)

An Introduction to Spreadsheet Software. Computers have vastly expanded the speed and analytical capabilities of spreadsheets. Keeping up with the options available is another matter. This course introduces you to the electronic spreadsheets now on the market. You'll discover how they can increase your productivity, what their limits are, and which one is right for your work. **$60.00** (Code: 1003)

An Introduction to Personal Computer Communications. Are you making the most of your PC's ability to communicate with other computers? Getting the most benefit from "electronic mail" ? This course describes the necessary communications hardware (modems, etc.), communications software and protocols. It provides a range of applications for personal computer communications, from telecommuting (working at home) to making airline reservations. And it introduces the novice to many of the more technical terms and functions related to communications. **$60.00** (Code: 1004)

Effective Use of Word Processing on a Personal Computer. Even if they buy the right package, personal computer users often don't make the most of their word processing software. This course shows you how to maximize potential productivity gains and put various writing styles to their best use. In addition to explaining typical word processing features, the course discusses the many types of software available and gives you a rundown on pitfalls to avoid. **$60.00** (Code: 1005)

Learning about PCs couldn't be easier . . . and the payoff couldn't be quicker. Order the Boeing Tutorial Series today, and cash in now.

BOEING

ORDERING INFORMATION
Return this coupon with your check (including applicable sales tax) to: BOEING COMPUTER SERVICES, Software and Education Products Group, Attn: Marketing, M/S 7K-11-01, P.O. Box 24346, Seattle, WA 98124. Or call **(206) 763-5000.**

Please send the Boeing Tutorial Series for the IBM PC.

___ copies, 1001 @ $85.00

___ copies, 1002 @ $60.00

___ copies, 1003 @ $60.00

___ copies, 1004 @ $60.00

___ copies, 1005 @ $60.00

Name _____

Title _____

Company/Organization _____

Business Address _____

City _____ State _____

Zip _____ Phone _____

IBM is a registered trademark of International Business Machines Corporation. Boeing and Tutorial Series are trademarks of The Boeing Company.

Circle 975 on reader service card

Can your editor work with 16,000,000 bytes of memory?

SPF/PC™ 1.8 from CTC can!

The best full screen editor for the IBM PC is now even better than ever. It looks and works like IBM's large system SPF editor, but SPF/PC executes faster and handles larger files than its mainframe cousin.

AT EXTENDED MEMORY
SPF/PC can use up to 15,850 KB of memory.

TOP VIEW COMPATIBLE
SPF/PC supports windowing and background execution.

COMMUNICATIONS FEATURE
Easy to use communications software.

$195
UPGRADES only $50
($10 if communications upgrade)
Add $5 for shipping
Canada $10 Foreign $15
MasterCard VISA
Check or purchase order accepted.

FAMILY TIES

- **SPF/PC** is used by IBM to demonstrate the IBM 3270/PC to its corporate clients
- **SPF/PC** provides the same outstanding performance on any PC, from JR to AT
- **SPF/PC** works with DOS 1.00–3.00 and any IBM PC or true compatible with 192K

IBM is a registered trademark of International Business Machines, Inc. SPF/PC is a registered trademark of Command Technology Corporation.

TO ORDER SPF/PC...

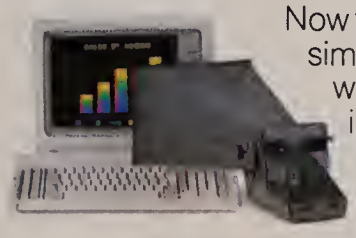
Contact: Command Technology Corporation
1900 Mountain Boulevard
Oakland, CA 94611.

(415) 339-3530
Telex: 509330

Circle 879 on reader service card

Cheap Shot.

Get instant slides and prints directly from your personal computer. Introducing Screenshooter.™ Only $175.



Now there's a simple, low-cost way to make instant prints and slides from any color or monochrome computer monitor. Do it yourself. On-the-spot. Right at your own desk.

Screenshooter includes the Polaroid OneStep 600 instant camera, CRT hood, CRT hood adapter, diopter lens, and 35mm SLR camera bracket. Plus a 90-day money-back satisfaction guarantee!

Add the Polaroid 35mm Instant Slide System and use your 35mm camera to make instant slides for last-minute presentations. The system includes an AutoProcessor, slide mounter, and custom slide mounts. Just $99.

Free Film Offer.*
Order by June 30, 1985 and get two free packs of Polaroid 600 High Speed film with your Screenshooter and two free 12-exposure rolls of Polachrome Instant Slide film with your 35mm Instant Slide System.
Why wait?

*Offer void where prohibited. U.S. residents only.
"Polaroid"® "Screenshooter"™

Circle 956 on reader service card

Shoot your computer for $175!
Send check, money order, credit card number, or corporate purchase order, plus the completed coupon to: NPC Screenshooter Promotion, P.O. Box 245, Newton Upper Falls, MA 02164. **Or call: 800-225-1000.**

Please rush me:
_ Screenshooter(s) @ $175 _____
_ Polaroid 35mm Instant Slide System(s) @ $99 _____
Shipping and handling (@ $1.75 per item) _____
Add sales tax where applicable _____
Total purchase price _____

I would like to pay by: ☐ Corporate Purchase Order ☐ MasterCard ☐ VISA ☐ Check/Money Order

CORPORATE PURCHASE ORDER NUMBER
CREDIT CARD NUMBER EXPIRATION DATE
SIGNATURE
NAME
ADDRESS
CITY STATE ZIP
TELEPHONE PCW 5-85

Screenshooter
A product of Newton Plastics Corp.

handy™

EXTEND YOUR PC POWER WITH HANDY

Whatever you are doing on your computer, whatever programs you are running,

HANDY™ is readily available at just a keystroke with any of its functions or help screens. After you're done with HANDY, you will resume at exactly where you left off. And HANDY only occupies 9 to 21K bytes of RAM.

GET A KICK OUT OF HANDY!

• DISK PRINT SPOOLING

FINALLY! HANDY can free you from those seemingly endless printouts, which prevent you from working on your computer.

HANDY™ offers a unique function—the ability to print while working on some useful programs.

Isn't it time to stop wasting your computer time?

Available also as HANDY-2, requiring only 9K bytes of RAM.

• PERSONAL ADDRESS/TELEPHONE DIRECTORY & DIALER†

HANDY displays full screen "dossier" or just a header of your file contents for quick perusal. You are able to print full descriptions or simply an address list in mailing label format. You have quick access to your telephone directory and automatic dialing for both speech or data calls†. Even more, you can accomplish this task without a SMARTMODEM, which translates to a savings greater than the cost of HANDY. This is another feature uniquely offered by HANDY.

• PERSONAL AUTO DIARY & ALARM CLOCK

HANDY stores messages to be displayed at an exact predefined time. It will remind you of any messages or events with an audible alarm. Its flexibility allows you to easily change, review, print the messages or calculate the day of the week for a specified date.

• PERSONAL NOTEBOOK

HANDY automatically dates and time stamps your notes with current date and time, or with a date and time of your choosing. Editing facilities include change, review and print for a specified period of time.

• DISK DIRECTORY OR FILE CONTENTS DISPLAY

On the spot display of a disk directory or contents of any disk file, while the foreground processing is active.

• HANDY TELECOMMUNICATIONS

Instant access to Dow Jones, EasyLink, data bases, even computer networks.

telex: 221213

ORDER YOUR HANDY TODAY!!

HANDY™ – 1—$49.95 includes only Disk Print Spooling and Disk Directory of file contents display
HANDY™ – 2—$79.95 full package without telecommunications
HANDY™ – 3—$109.95 full package

(Add $5.00 for shipping and handling)
30 days money-back guarantee.
Available for the IBM PC, AT, XT and true compatibles

To order with VISA or MASTER CARD, call
Toll free **1-800-527-0008**
New York State **212-889-1225**
Dealer/OEM Inquiries welcome **212-889-1226**
To order by mail send checks or money orders to:

icn

ICN SYSTEMS, INC.
431 Fifth Avenue, 5th Fl.
New York, NY 10016

New York State residents add 8.25% sales tax. Outside the U.S.A., add $15.00. Sorry, no C.O.D. or purchase orders.
HANDY™ is a trademark of ICN Systems, Inc.
† FCC approval pending. Priced separately.
Dow Jones is a trademark of Dow Jones & Co., Inc.
EasyLink is a service mark of Western Union

Circle 979 on reader service card

WordPerfect is just that.

PC World

At SSI, we face a monumental challenge; living up to the name we gave our word processing software. After all, with a name like WordPerfect, the product had better measure up. Obviously it's doing just that. For good reason.

Simplicity.

Most WordPerfect functions require only one keystroke, a simple press of a finger. And comprehensive, well-written documentation makes learning a breeze.

> even a beginner can soon master *WordPerfect's* most difficult functions, such as

PC World

Speed.

With WordPerfect's document orientation, you never have to wait between pages of text. No matter how fast you type, WordPerfect won't slow you down.

Features.

In addition to standard word processing functions, WordPerfect includes several comprehensive, useful features not found on many word processors. Like a 100,000-word phonetic dictionary; multi-page footnoting capability; table of contents and index generation; automatic outlining and paragraph numbering; and a network version of WordPerfect.

> There is very little this program *WordPerfect* can't do."

InfoWorld

Get the word processor that's living up to its name. WordPerfect. For more information, see your dealer.

Or call or write:
SSI Software
288 West Center Street
Orem, Utah 84057
Information: (801) 224-4000
Order Desk: 1-800-321-4566, Toll-free.

SSI Software
Reaching for perfection.

Circle 165 on reader service card

It Doesn't Print Any Dirty Words!

Printouts should be crisp, clean and completely legible.

And that's what the 24-pin system guarantees. Letter-quality...without smudges, without blotches, without gaps, without any dirty words.

The Brother M-2024 has what it takes: incredible dual mode speed...draft at 160 cps and letter-quality at 96 cps (elite). Other features include push type bidirectional tractor feed which saves on paper costs because of the one-inch cut from the print head, standard Centronic parallel interface and impeccable engineering that promises to outlast the competition.

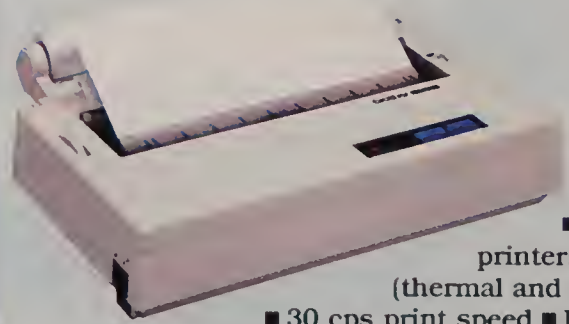
Plus, Brother is compatible with virtually every type of small business computer, word processor, personal computer or home computer system. All the latest state of the art developments that will set the quality, value and productivity standards for years to come.

For more information, write to Brother for the name of your nearest dealer.

brother®

LETTER QUALITY DOT MATRIX PRINTER

Brother Dot Matrix Printers For Business And Personal Computers



MODEL HR-5
COMPACT & LIGHTWEIGHT THERMAL TRANSFER PRINTER

- Dual function printer; non-impact dot (thermal and plain paper)
- 30 cps print speed
- Full 80 column printout
- Bidirectional text printing
- Battery powered, AC adaptor available
- Centronic parallel or RS-232C serial interface

MODEL M-1009
IMPACT PERSONAL PRINTER

- Lightweight for portability
- Low noise operation
- 50 cps bidirectional printing
- 20 million character service life
- Built-in standard Centronic parallel interface
- Includes tractor feed as standard

BROTHER INDUSTRIES, LTD.
Nagoya, Japan

BROTHER INTERNATIONAL CORP.
HEADQUARTERS: 8 Corporate Place, Piscataway, NJ 08854 ■ 201-981-0300
WESTERN REGIONAL OFFICE: 20 Goodyear, Irvine, CA 92718 ■ 714-859-9700

Circle 808 on reader service card

Just Announced

A selection of new PC products

Featured this month: an analytical data base manager, a dot matrix color printer, an internal modem, two computers, and a project management program

Wes Nihei

Hardware

Computers

Ericsson PC

Question: What international telecommunications giant recently jumped into the PC-compatibles arena? Advance one square if you answered "Ericsson," the Swedish equivalent of AT&T. With the 16-bit, 8088-based Ericsson PC (EPC), the company adds a desktop computer to its line of telecommunications workstation products. The EPC features a 12-inch amber monitor that supports medium (320- by 200-pixel), high (640- by 200-pixel), and extra-high (both 320- by 400- and 640- by 400-pixel) resolution graphics. Text mode resolution is 720 by 400 pixels. The large character matrix (9 by 16 compared to 8 by 14 for the PC) improves on the PC's text mode resolution.

Except for its microchips and floppy drives, the computer is manufactured entirely in Sweden and reflects its Scandinavian origin with functional but stylish ergonomics. With its two 360K half-height floppy disk drives mounted one on top of the other, the EPC's footprint is smaller than the PC's. The tan shell houses 256K of RAM expandable to 640K, a serial port, a parallel port, and six expansion slots. In operation the EPC is virtually silent.

The keyboard mimics the IBM PC's layout but has a larger <Enter> key; double-sized <Shift>, <Ctrl>, <Tab>, and <Backspace> keys; and <NumLock> and <CapsLock> lights. Ericsson has added an extra <Enter> key to the right side of the numeric keypad, which is a boon to those familiar with a 10-key calculator.

The system comes with MS-DOS 2.11 and GW BASIC. Available options include a 10MB internal hard disk, a color monitor, a color graphics board, a multifunction board with 128K or 384K of

Ericsson PC, Ericsson

RAM, a real-time clock, and a serial port. List price: with two disk drives and a monochrome monitor $3295.

Ericsson, Inc.
Greenwich Office Park 1
Greenwich, CT 06836
203/661-1666

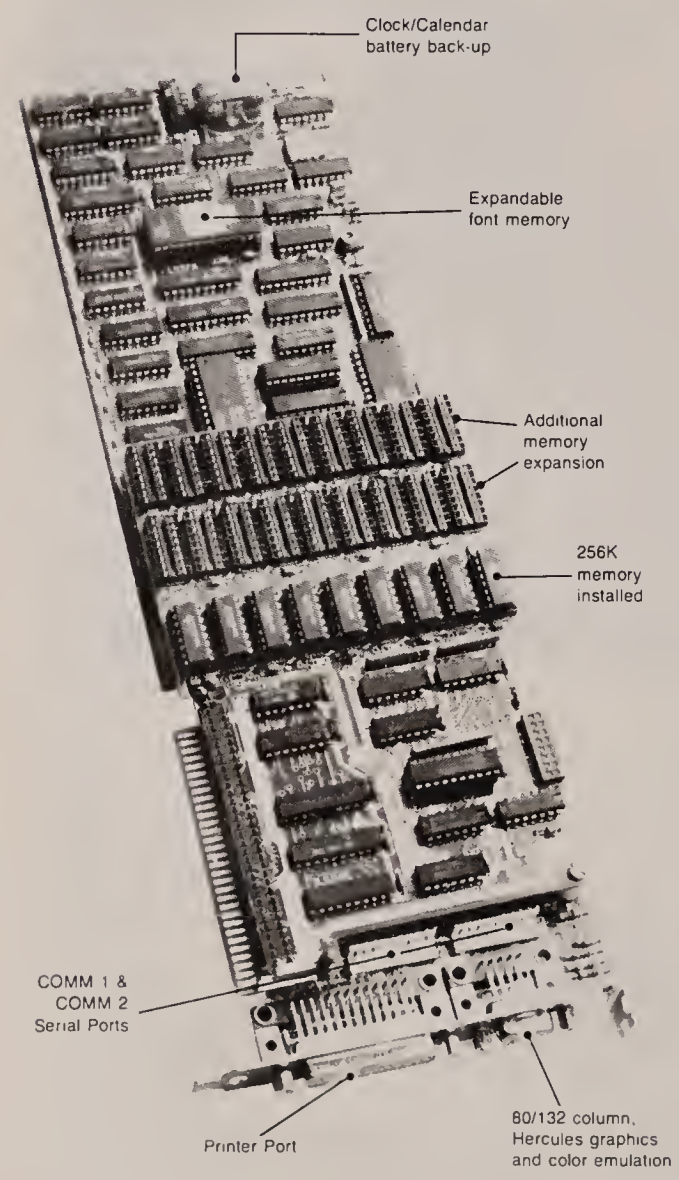
Kaypro 16

The 16-bit transportable Kaypro 16 falls right in line with Kaypro's budget-conscious, utilitarian approach. By offering its first PC compatible with an internal hard disk and a full complement of software for $3295, Kaypro has carved a niche in the small-business market between the

Introducing...

UltraPAK™-256 from Tseng Labs

Before You Integrate Your IBM PC™,* Take A Look At What We Can Put Into 1 SLOT



- ✓ IBM™ Monochrome Adapter Replacement
- ✓ High Resolution Monochrome Graphics (720 x 348, Lotus™ and Hercules™ Compatible)
- ✓ Color Graphics Emulation on Mono Display
- ✓ Supports 80/132 column VT100 Terminal Emulation
- ✓ **256K** System Memory Installed (Expandable to 384K or 512K for Compatibles)
- ✓ Parallel Printer Port
- ✓ 2 Serial Port Capacity (1 std., 1 optional)
- ✓ Clock Calendar with Battery Back-Up
- ✓ Includes 132 x 44 Text Driver for Lotus 1-2-3™
- ✓ Ramdisk and Print Spooler to speed up your application program
- ✓ Provides BIGANSI device driver
- ✓ Diagnostics Program to ensure reliable operation
- ✓ Full One-Year Warranty with Product Service by a Nationwide Service Organization

If You Can Find A Better Value, BUY IT!

UltraPAK™-256 Only $899 *256K RAM INSTALLED*

UltraPAK™-256/S Only $749** *256K RAM INSTALLED*

* also supports most IBM PC compatible computers
** UltraPAK-256/S serial ports and battery backed clock not available

Tseng Laboratories, Inc.
205 Pheasant Run, Newtown Commons, Newtown, PA 18940
(215) 968-0502 TELEX 705179
Enhancement technology for personal computers.

Lotus and Lotus 1-2-3 are trademarks of Lotus Development. IBM and IBM PC are trademarks of International Business Machines. Hercules is a trademark of Hercules Technology. UltraPAK is a trademark of Tseng Laboratories, Inc.

Circle 707 on reader service card

ALL AIRLINES DEPART FROM THIS TERMINAL.

Presenting Travelshopper℠ ...new from CompuServe and TWA.

Now you can save time and money by getting information and reservations on virtually any flight on any airline—worldwide—from one source. It's TWA's new Travelshopper, available now through CompuServe's Information Service.

With Travelshopper, you scan flight availabilities, discover airfare bargains and order tickets...on your own personal computer...at home or in the office.

You also receive automatic membership in TWA's Frequent Flight Bonus℠ program. And you can build bonus points by staying at Marriott and Hilton hotels and by using Hertz Rent-A-Car.

Besides Travelshopper, CompuServe offers an ever-growing list of other travel-oriented on-line services.

The Official Airline Guide Electronic Edition lists direct and connecting flight schedules for over 700 airlines worldwide plus over 500,000 North American fares.

A to Z Travel/News Service gives complete information for over 20,000 hotels worldwide plus latest travel news.

Discover Orlando provides complete prices, hours and features on all of Central Florida's attractions and accommodations.

West Coast Travel offers travel information for the western states.

Pan Am's Travel Guide contains up-to-date information on immigration and health requirements for most foreign countries.

And TravelVision® provides complete automotive information including road maps and personalized routing service.

Let your travel plans really take off. Use Travelshopper and lots, lots more from CompuServe.

To buy a CompuServe Starter Kit, see your nearest computer dealer. To receive our informative brochure, or to order direct, call or write:

CompuServe

P.O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220

1-800-848-8199

In Ohio, Call 1-614-457-0802

Circle 856 on reader service card

An H&R Block Company

Travelshopper and Frequent Flight Bonus are Service marks of TWA.

higher-priced Compaq-Plus and IBM XT and the less expensive Tandy 1200 desktop.

Encased in one of Kaypro's distinctively spartan metal shells, the 8088-based machine contains a 10MB hard disk and one 360K half-height floppy disk drive. It comes equipped with 256K of RAM expandable to 640K and a BIOS written by Phoenix Software Associates that carries Phoenix's guarantee of PC com-

Kaypro 16, Kaypro

patibility. The 35-pound unit has an internal 9-inch green display, a detachable keyboard with a PC layout, a color graphics board, a serial port, and a parallel port, but only one expansion slot—a potential drawback.

Bundled software consists of five MicroPro International products, including *WordStar* and *MailMerge*, and a package of on-line tutorials for each MicroPro product. Kaypro has dressed up the entire MicroPro family with an easy-to-use menu. Also included are MS-DOS 2.11, GW BASIC, and *Mite*, a telecommunications program from Mycroft Labs. List price: $3295.

Kaypro Corp.
533 Stevens Ave.
Solana Beach, CA 92075
619/481-4300

Modems

UltraLink

UltraLink is a 300/1200-bps internal modem that allows simultaneous conversation and data transmission on a single telephone line. To activate UltraLink, you simply pick up the telephone receiver or push the external button attached to the modem. Without exiting the application program you're using, you can send a screen to another UltraLink-equipped PC, discuss (but not edit) the data, and return to the program where you left off.

UltraLink maintains its own communications software in 64K of on-board RAM and comes with its own power supply, so it makes no demands on system memory or power. The modem has a 100-name directory, an unattended scheduling function that sends files at a predesignated time with the PC turned on, and an optional Nite Owl feature that transmits data after the PC is turned off. UltraLink programs the ten PC function keys for single-key operation; the <F1> key displays help screens. List price: $895, Nite Owl $189.

Modern Technologies International, Inc.
656 Bair Island Rd. #302
Redwood City, CA 94063
800/223-6250, 800/521-6790 California

Printers

Epson JX-80

Seven-color printing and Epson's proven reliability make the JX-80 (the company's first color model) an attractive addition to the popular dot matrix printer family. Essentially the FX-80 workhorse dressed up with color, the JX-80, priced at $799, may be the best value in its class on the market.

The printer uses a cassette with a 1-inch ribbon striped black, magenta, cyan, and yellow and overprints two colors to produce green, orange, and violet. The JX-80 boasts 160 cps for draft printing and 80 cps for near-letter-quality printing. Graphics resolution is 240 by 216 dots per inch. A

Epson JX-80, Epson America

parallel port with a 2K buffer is standard. Options include a serial port with either a 2K or 32K buffer and a parallel port with a 32K buffer. List price: $799.

Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505
213/534-4500

mbp COBOL for your IBM/PC

Now, more convenient... 4 (exclusive) ways.

Now, the mbp COBOL Compiler offers unrivaled convenience to go with its unmatched performance.

Here are the convenience features you've wished for:

1) an enhanced Screen Management System with program-controlled video attributes and color; **2)** support for PATH & sub-directories; **3)** DOS command execution from within a COBOL program; **4)** 'permanent' DEFAULT modification.

The new mbp Compiler has them all! And they're exclusives: you get them *only* with mbp.

GIBSON MIX Benchmark Results
Calculated S-Profile
(Representative COBOL statement mix)

Execution time ratio

mbp* COBOL	Level II* COBOL	R-M* COBOL	Microsoft* COBOL
1.00	4.08	5.98	6.18

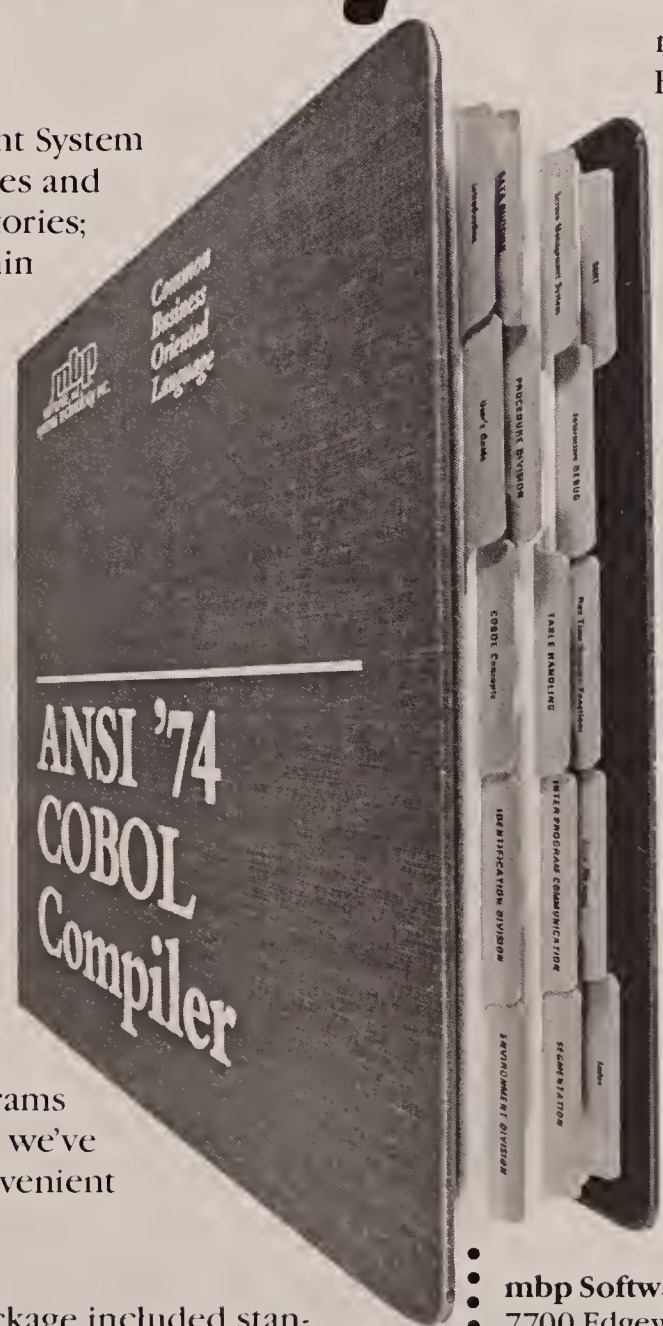
*128k system with hard disk required. IBM PC & AT are IBM TMs. Netware is a Novell, Inc TM. Level II is a Micro Focus TM. R-M is a Ryan McFarland TM. Microsoft is a Microsoft TM.

Plus, it's 4 times faster.

Because the mbp COBOL Compiler generates native machine language object code, it executes programs *at least* 4 times faster (see chart). Now, we've made that performance even more convenient to use.

The complete COBOL.

An Interactive Symbolic Debug Package included standard; Multi-keyed ISAM structure; SORT & CHAIN; GSA certification to ANSI '74 Level II; IBM/PC-AT and TI Professional compatibility; with mbp, you get it all. Optional: Novell NetWare interface.



mbp COBOL: the choice of professionals.

It's no surprise more and more companies like Bechtel, Bank of America, Chase, Citicorp, Connecticut Mutual, Hughes Aircraft, McDonnell-Douglass, and Price-Waterhouse choose mbp COBOL.

Make it your choice, too. Just send the coupon, or call, for complete information. Today.

mbp COBOL. $1000

Please send complete mbp COBOL information to:

NAME _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

_____

PHONE _____

mbp Software & Systems Technology, Inc.
7700 Edgewater Drive, Suite 360
Oakland, CA 94621
Phone 415/632-1555

Circle 100 on reader service card

HARD DISKS ARE NOT LIKE POLITICS, THERE IS NOTHING CONFUSING ABOUT THEM....

....AT LEAST NOT AT THIS CIA.

SPECIAL SPRING SALE ON ALL INTERNAL SUBSYSTEMS!

Reliance 10 Megabyte Internal	Was $1,165	Spring Special	$ 875
Reliance 10 Megabyte External			$1,265
Reliance 10 Megabyte External w/3.3 MB Floppy Backup			$1,995
Reliance 20 Megabyte Internal	Was $1,650	Spring Special	$1,295
Reliance 20 Megabyte External			$1,750
Reliance 20 Megabyte External w/3.3 MB Floppy Backup			$2,499
Reliance 40 Megabyte Internal	Was $2,270	Spring Special	$1,775
Reliance 40 Megabyte External			$2,370
Reliance 40 Megabyte External w/3.3 MB Floppy Backup			$3,120
Reliance 3.3 MB Floppy Internal			$ 875
Reliance 3.3 MB Floppy External			$1,250

ALL DRIVES INCLUDE CONTROLLER CARDS AND CABLES

ALL SUBSYSTEMS ALSO AVAILABLE AS PART OF AT&T PC 6300 CONFIGURATION

Dealer inquiries invited

Volume discounts available

Call for technical specifications, price lists or information on other CIA computer products and services.

CIA Computer Integration Associates

450 East Kennedy Blvd.
Lakewood, N.J. 08701
(201) 370 3900

Free CIA's unmatched service

Free one year guarantee

Circle 990 on reader service card

HOW TO BUY SOFTWARE WHEN ALL THE ADS LOOK THE SAME.

We know it's hard to choose a software house. All the ads say the same thing—"Lowest prices," "fastest delivery," "best support," "biggest inventory."

Trouble is, although the claims are the same, the companies are very different. Which is why we want you to know some important facts about *us:*

1. 800-SOFTWARE is one of the oldest and most reputable firms in the industry. Our customers include Coca-Cola, GE, Hewlett-Packard, Xerox, AT&T, and thousands of other satisfied buyers.

2. Our National Accounts Program offers volume discounts and valuable services to large software users. We offer *incredibly* low prices on large bids!

3. We have a giant, $1,000,000 inventory. Which means we can offer next-day delivery if needed.

4. With every product you get friendly, expert technical support. Have a question? You'll be glad you bought from 800-SOFTWARE!

5. We'll match our competitors' prices on most products. We *never* cut service.

6. We never charge extra for credit card purchases, nor do we process for payment until the product is shipped. (Our competitors don't make this claim!)

7. You'll automatically receive our Technical Support Newsletter—a great way to stay up-to-date.

8. We are members of the Better Business Bureau and the Direct Marketing Association.

9. We want your business. *And* your repeat business. Which is why we work so hard to keep you happy. Give us a call and let us *prove* it!

CHECK OUT ALL OUR INCREDIBLE PRICES:

Wordstar 2000/2000 Plus CALL	**PFS File/Graph/Write** $84	**Okidata 92/93** $389/$629	**Epson Printers** CALL
RBase 4000 $259	**SuperCalc 2/3** CALL	**Hercules Color/Graphic Card** $199/$325	**IUS Accounting** $299/mod.

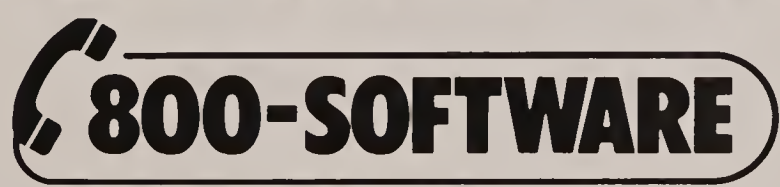
SOFTWARE	
BORLAND SOFTWARE™	
Sidekick	CALL
Turbo Pascal/BOB7	$39/$79
BOURBAKI™	$ 79
DECISION RESOURCES®	
Chartmaster	$249
Signmaster	$189
DIGITAL RESEARCH™	CALL
FOX & GELLER™	CALL
FUNK SOFTWARE™ Sideways	$ 49
HARVARD SOFTWARE™	
Harvard Project Manager	$289
IMSI™ PC Paintbrush	$ 99
LIFEBOAT LATTICE C-COMPILER™	$359
LIFETREE™ Volkswriter Deluxe	$179
MICROPRO®	
WordStar	$209
WordStar 2000/2000 Plus	CALL
WordStar Pro Package/P.P. Plus	$259/$359
InfoStar	CALL
All Other Products	CALL

MICRORIM™ RBase 4000	$259
MICROSOFT®	
Multiplan	$125
Fortran	$269
All Other Products	CALL
MICROSTUF™ Crosstalk	$ 95
MULTIMATE™	$255
ROSESOFT™ Pro Key	$ 99
SOFTWARE PUBLISHERS™	
PFS File/Graph/Write	$ 84
PFS Report	$ 75
SORCIM/IUS™	
SuperCalc 2/3	$159/$195
EasyWriter II System	$185
IUS Easy Business Accounting	$299/mod.
Super Project	$209
All Other Products	CALL

HARDWARE, ETC	
AMDEK™ Monitors	CALL
AST™ Products	CALL
ATI™ & CDEX™ TRAINING	CALL
CODE-A-PHONE Tel-A-Modem	$479
EPSON™ PRINTERS	
FX 80, FX 100 & LQ 1500	CALL
HAYES™	
Smartmodems 1200/1200B	CALL
HERCULES™	
Color Card	$199
Graphic Card	$325
MAXELL™ & MEMOREX™ DISKETTES	CALL
MEMORY CHIPS	CALL
OKIDATA™ PRINTERS	
92 IBM	$389
93 IBM	$629
PRINCETON GRAPHICS™ MONITORS	CALL
QUADRAM™	CALL
WESTERN UNION EASY LINK®	FREE

WE ALSO CARRY HUNDREDS OF OTHER PRODUCTS FOR THE IBM-PC® AND COMPATIBLES, MACINTOSH®, APPLE II® AND CP/M®!

800-SOFTWARE, INC.
940 Dwight Way
Berkeley, CA 94710

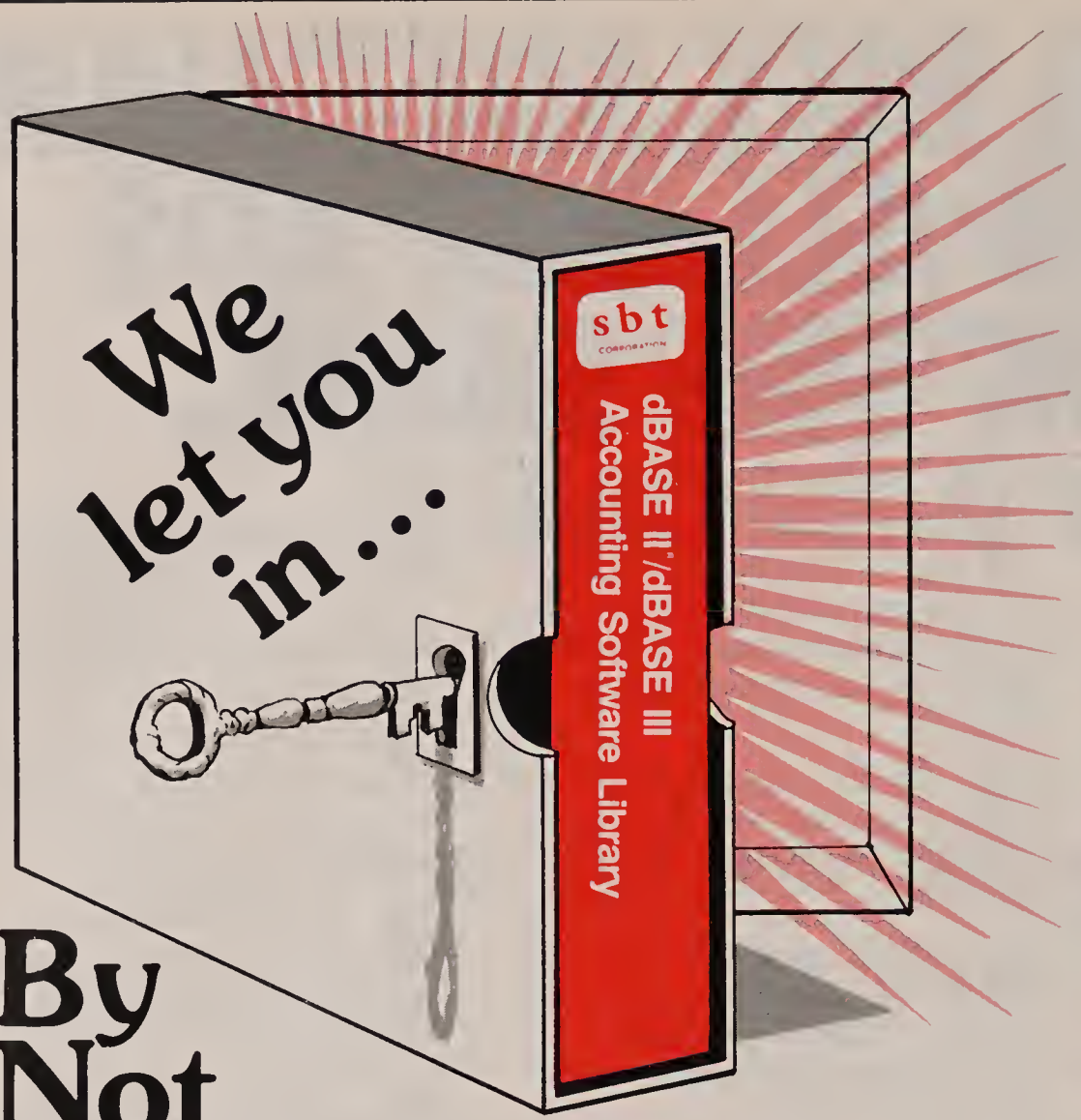


To order call toll-free:
800-227-4587 OR 415-644-3611

Circle 214 on reader service card

Dealer inquiries welcome.
Quantity discounts available through our National Accounts Program.
Purchase orders accepted. Please call us in advance.
Call for shipping charges. Overnight delivery available.
We do not add surcharge for credit card purchases.
Prices may change. Above prices are for IBM-PC and compatibles.
International orders welcome: TELEX #751743 800 SOFTWARE UD.

© Copyright 1985, 800-Software, Inc.



By Not Locking you Out.

SBT has unlocked the secrets to accounting with the Accounting Software Library, the Key to controlling your business. As your business grows, SBT's independent modules may be added and integrated to meet your changing needs. And we include the **Source Code** *at no additional cost.*

.dProfessional	Time & Billing	**$395**
.dOrder	Order Processing	**195**
.dInvoice	Billing/Inventory	**195**
.dStatement	Accounts Receivable	**95**
.dPurchase	Purchase Order	**195**
.dPayable	Accounts Payable	**295**
.dPayroll	Payroll/Labor	**395**
.dLedger	G/L / Finance	**395**
.dAssets	Asset/Depreciation	**195**
.dProject	Job Costing	**345**

VISA

CALL TODAY (408) 980-8880

sbt CORPORATION

Gives you the Source Code.

1140 Mountain View-Alviso Road • Sunnyvale, CA 94089

Circle 431 on reader service card

Storage Devices

Masterflight

Masterflight packs a great deal into a small package: a half-height 10MB, 20MB, or 30MB hard disk; a 10MB, 20MB, 40MB, or 60MB half-height streaming-tape

Masterflight, Kamerman Labs

backup system; five front-mounted power direction switches (computer, monitor, printer, and two auxiliaries), a surge protector, and a locking power switch for security, all within a single unit just 2½ inches high. With a footprint the same size as the PC's, Masterflight fits compactly between the monitor and the PC's system unit, looking as if it should have been there all along. List price: 10MB hard disk with 10MB tape backup $3095, 30MB hard disk with 60MB tape backup $4995.
Kamerman Labs
8054 S.W. Nimbus Ave., Bldg. 6
Beaverton, OR 97005
800/522-2237, 503/626-6877
Oregon, Hawaii, Alaska

SUDDENLY IT'S EASY TO GET YOUR WHOLE MESSAGE ACROSS... WITH Dr. HALO

Dynamic Software...Sophisticated Graphics...Simple to Use

Dr. HALO is a simple to use software program, friendly to both the greenest computer-newcomer and the high-tech professional. It performs beautifully as your graphics helper, software enhancer and all around graphics integrator. High resolution monochrome or color graphics are professionally rendered by the good Doctor. All for a price that's designed to pique your interest: $99.95.

Sources of Per Capita Income
(Constant 1980 Dollars)

	1980	1982	1984
Wages and Salary	68.2	64.2	64.2
Other Labor Income	4.2	5.2	6.2
Proprietors' Income	8.1	6.9	6.8
Rental Income	2.3	1.8	1.5
Dividends	2.9	2.5	2.7
Interest Income	8.0	9.2	9.5

A Colorful Performer

How does it work? Point and Pick. Simply select the "icon" you want to use to create each part of the picture. What are your choices? Pencil, Paint Can, Type Styles, Airbrush, Line Styles, are only a few. Pop-up menus add power and flexibility to the main icons for sketching, painting, cutting and pasting, drawing curves, etc.

Dr. HALO's symbol library lets you store any symbol you've created and retrieve it to use in future programs/reports/presentations/floor plans/circuit design. Should you want to use that symbol as a logo, paintbrush or hatch pattern, it's always there to use again.

Dr. HALO's eight high quality type faces give you a broad choice of styles with which to shape your ideas—italic, serif, sans serif and greek in virtually any size that fits on the screen. You determine line width, type path, colors, and pattern fills.

Dr. HALO can support all the colors your graphics card has to offer. Colors can be changed, interchanged and reversed. And with Dr. HALO any image can be rotated, flipped or mirrored.

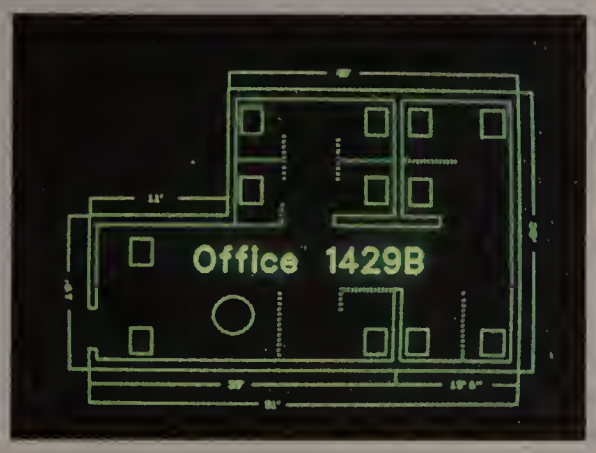
All Things to All People

Dr. HALO's unique flexibility hails from the most widely used library of graphics functions under MS®/DOS today—HALO.

With its GRAB and SHOW programs, Dr. HALO allows you to capture graphics from other applications including LOTUS 1-2-3,® SUPERCALC,® and even CAD packages and assemble them as a slide show.

If you have an IBM® PC, XT, AT, PC Jr., Texas Instruments Professional® or any IBM compatible computer, you're ready to run with Dr. HALO. A mouse, joystick, digitizer, touch-pad or keyboard will bring your screen to life. And Dr. HALO supports the most popular monochrome and color graphics boards, and dot matrix, color and inkjet printers.

So if you want dynamic graphics that clearly put your whole message across, send for the software that paints the whole picture. Dr. HALO.



To order or receive information: Call Media Cybernetics, Inc., at (301) 270-0240.

For dealer information and pricing call (800) 446-4256.

media cybernetics

MS, LOTUS 1-2-3, SUPERCALC, IBM, Texas Instruments Professional are all registered trademarks of Microsoft Corporation, Lotus Development Corporation, Sorcim Corp., International Business Machines, and Texas Instruments Incorporated respectively.

Circle 971 on reader service card

THE "WHERE ON EARTH DO YOU LOOK FOR IT" FINDER

Where on earth do you look for that product? The answer is DIRECT NET. If it exists, chances are you'll find it under one of our listings.

We offer, through your modem, software and hardware product information. We offer manufacturer information, PC World subscription and program listings . . . even electronic mail and bulletin boards. And we're thorough. For instance, you want to find that product but you only have a description. Our product information menu can find that product by name, category, manufacturer, description, or our exclusive multiple parameters method.

After you've found it, we can tell you all you want to know about it, give you a demonstration . . . and even order it for you. That's because we're DIRECT NET, the "where on earth do you look for it" finder. And after you've found us, you'll be sitting on top of the world.

• Direct-Net is available at an introductory annual membership fee of $50. There is n
initial contact fee—connect time charges are $10/hr.
• A demonstration disk and instruction manual is available for $10 (applied towards
annual membership fee).
• Special membership information for computer retailers and consultants is availabl
upon request.

Nationwide: 800-223-0822
(In California: 800-824-5526)
MasterCard Visa orders through 800#.

☐ $50.00: Membership Fee, DN-COMM Software Package, Instruction manua
☐ $10.00 Demonstration Disk, Instruction Manual (applies toward membersh
plus 6% sales tax for California Residents only

Name _____

Company Name _____

Address _____

City/State/Zip _____

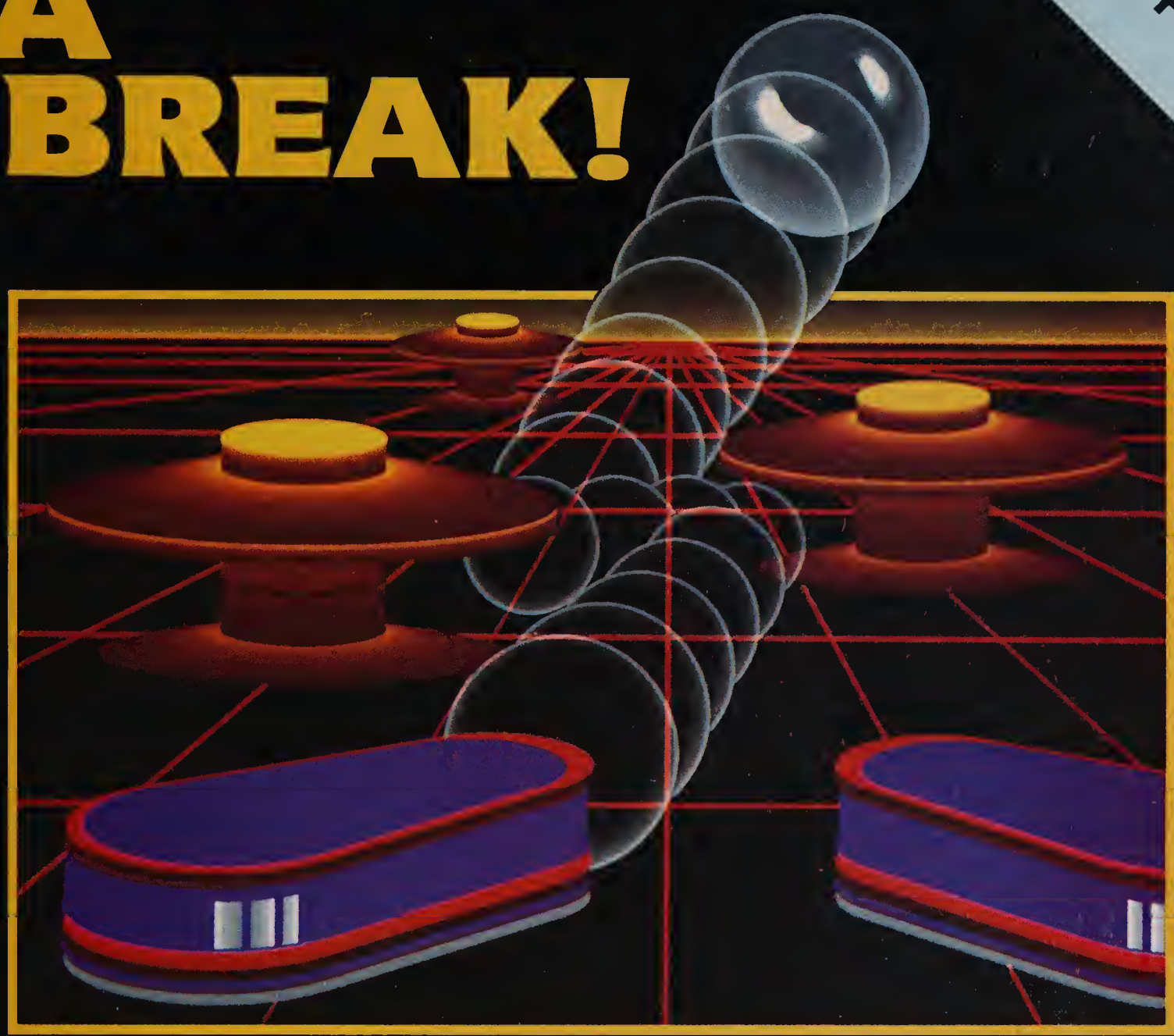
Telephone Number ( ) _____

DIRECT·NET

31220 La Baya Dr., Suite 110
Westlake Village, CA 91362

TAKE A BREAK!

For IBM PC, XT, AT, and PCjr



WITH NIGHT MISSION

PINBALL

You deserve the best. You've earned it. Now reward yourself with a session of Night Mission PINBALL, the most realistic and challenging arcade simulation ever conceived! ■ Stunning graphics and dazzling sound effects put Night Mission PINBALL in a class by itself. Game features: multi-ball and multi-player capabilities, ten different professionally designed levels of play, and an editor that lets you create *your own* custom modes. ■ So take a break with Night Mission PINBALL from SubLOGIC. Winner of *Electronic Games* magazine's 1983 Arcade Award for Best Computer Audio/Visual Effects.

See your dealer . . .

or write or call for more information.

Order Line: 800 / 637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Circle 308 on reader service card

LOOK AT THESE PRICES!

Nashua

BOXED DISKETTES These are boxed diskettes, not generic bulk wrapped. Don't be fooled by ads with low prices on Nashua — these are the lowest prices possible on Nashua boxed diskettes.

100 + (in boxes of 10)

5¼" Single Sided/ Double Density ..... $ .99

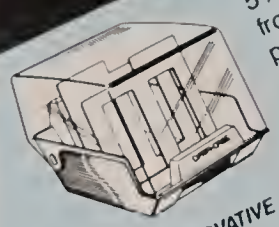
5¼" Double Sided/ Double Density $1.09

Minimum order 100 diskettes.

DATA-CASE

Stores and files up to 50 5¼" diskettes. Made from durable styrene plastic. With order of 100 or more diskettes

Only $8.95
Regular $9.95



INNOVATIVE CONCEPTS, INC.

CALL TOLL FREE 1-800-USA-FLEX
IN ILLINOIS 1-312-351-9700

Please mention this ad when calling in your order. MasterCard, Visa, C.O.D. or net 30 days with approved credit on purchases over $200.00. Prices subject to change without notice.

COMARK

COMARK, INC. 135 N. Brandon
Glendale Heights, Illinois 60139

Circle 613 on reader service card

Application Software

Business Management

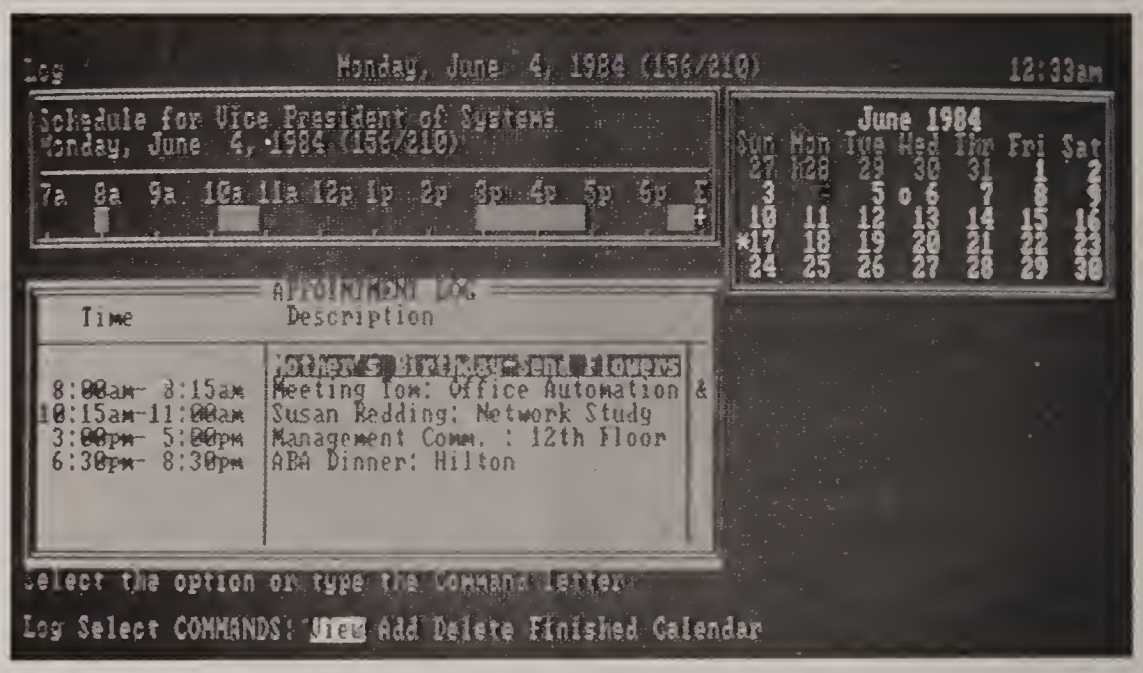
Higgins

With *Higgins* you may discover that highly efficient administrative assistant you always hoped was lurking in the PC XT or AT. This menu-driven program has nine integrated functions that organize the administrative chores any good AA would handle.

The *Higgins* Time Manager function displays in two windows a monthly calendar that highlights important days and a horizontal bar graph that indicates meetings throughout the day in hourly time slots. A third window either lists that day's activities or displays one of the program's other functions.

The Directory function lists addresses and telephone numbers. When used with a modem, *Higgins* automatically dials a telephone number, selecting the correct long distance service for any area code. Things To Do organizes a list of tasks by project, priority level, and due date. Personal Files, organized by any subject you choose, stores all related information entered into the other *Higgins* functions. Calculator, not surprisingly, is a full-function calculator. Clock is an internal clock with visual or audio alarms and a stopwatch. Tickler Reminder provides a visual nudge or an audio alarm for important events. Scratch Pad holds notes, and Expense Report records outlays by project.

The Report function produces nine standard reports as well as customized output. The Archive function stores on backup media material developed prior to a designated date and then purges the original information from the hard disk.



Time Manager function, Higgins, Conetic Systems

We interrupt this magazine to bring you a truly uninterruptible power system

...at a truly affordable price.

The trim new Linegard 300™ is a true, continuous-duty UPS. On line all the time, it provides total, around-the-clock protection against blackouts, brownouts, surges, sags and noise interference. Why risk a critical load to the transfer time of a standby system? With Linegard 300™, there's no switch, no hitch. Sound good to you? Wait till you hear the price! You'll want all the facts now.

LINEGARD 300™

WABER
A Division of SL Industries, Inc.

Computer Accessories Group
300 Harvard Avenue
Westville, NJ 08093
Toll-free (800) 257-8384
In NJ (609) 456-5400

Nobody does it better.
Nobody can.

Circle 113 on reader service card

When it comes to your investment

Flipping a coin is a harmless way to help you make simple decisions: "Heads we go to the movies, tails we play Scrabble®."

But being flip with your investments could have harmful—even drastic—results.

Like having no coins left to flip.

Now, with a little help from your personal computer and Dow Jones Investment Software, you can start making more informed decisions—instead of playing hunches.

Whatever type of investor you are, Dow Jones can help you stay ahead of the odds.

Oil Stocks: To Buy or Not?

You're working out at the gym. The guy straining his biceps gives you a tip: "Oil stocks. They're undervalued right now."

Buy or not? How do you find out?

The Dow Jones Investor's Workshop™ can help. First you connect to Dow Jones News/Retrieval,® the #1 online resource for business and financial information. At the touch of a few keys, you can construct price and volume charts on the oil stocks that interest you. Two stocks are lower than they've been all year.

Now you move to financial and investment information. Analysts estimate low P/E ratios for two of the stocks. Another interesting sign.

In News/Retrieval's exclusive up-to-date file of The Wall Street Journal stories, you find that one of the companies has just acquired substantial interest in a highly profitable plastics manufacturer—a good move. You decide to buy.

Your Portfolio and Your Taxes.

The market says it's a good time to sell your high technology stocks. But is it the right time from the point of view of your taxes?

The Dow Jones Market Manager PLUS™ can help. Using News/Retrieval to update your portfolio throughout the year, the program tracks by tax lot your security transactions. Now, it's easy to calculate whether your profits from a sell will be taxed as income or capital gains. And what that will mean to your entire investment portfolio.

It's clear. If you wait two weeks to sell, you'll save 20% on taxes.

Dow Jones offers a comprehensive line of Investment Software that gives you the information and analytical tools you need to make smart investment decisions.

	Portfolio Management	Technical Analysis	Fundamental Analysis
Investor's Workshop™	●	●	
Market Manager PLUS™	●		
Market Analyzer™		●	
Market Microscope™			●

You can select the software program designed to meet your investment needs—whether you're a private investor or a sophisticated professional.

Dow Jones Software.
For informed decisions.

decisions, 50-50 isn't good enough.

Dow Jones Investment Software: Helping You Make Informed Decisions.

The Investor's Workshop and the Market Manager PLUS are from Dow Jones, publisher of Barron's and The Wall Street Journal, the standard in reliable and timely business and financial information.

So instead of playing your hunches or flipping coins, invest in Dow Jones Software. It could be the best investment you make this year.

To obtain a free brochure and information on where you can conveniently purchase Dow Jones Investment Software, fill out the coupon or call:

1-800-345-8500

Extension 240

(Alaska, Hawaii and foreign call 1-215-789-7008 ext. 240)

Fill out this coupon and mail to:
A. Callahan, Dow Jones and Company,
P.O. Box 300, Princeton, N.J. 08540

☐ Please send me a free brochure on Dow Jones Investment Software

☐ Please call me between ____ and ____ with more information

Name _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone _____

DowJones™ Software

BEE

"Heads I buy. Tails I sell."

Dow Jones Software, Investor's Workshop, Market Manager PLUS, Market Analyzer and Market Microscope are trademarks of Dow Jones & Company, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc. Scrabble is a registered trademark of Selchow & Righter Company. Copyright ©1985 Dow Jones & Company, Inc. All Rights Reserved.

Circle 973 on reader service card

A FULL C COMPILER FOR $49.95

The Ecosoft Eco-C88 compiler for the 8088 and MSDOS is going to set a new standard for price and performance. Consider the evidence:

Compiler	Eco-C88	Lattice (1)	C86 (1)
Seive	13	11	13
Fib	44	58	46
Deref	13	13	---
Matrix	21	29	27
Price	$49.95	$500.00	$395.00

(1) **Computer Language,** Feb., 1985, pp.73-102. Reprinted by permission.

The Eco-C88 compiler is a full K&R C compiler that supports all data types and operators (except bit fields). Now look at the other features we offer:

* 8087 co-processor support using a single library. If you install an 8087 later, the software will use it without having to recompile.
* A robust standard library with over 150 functions, including transcendentals, color, and others.
* OBJ output for linking with the MSDOS linker (LINK).
* Error messages in English – no cryptic numbers to look up. A real plus especially if you're just getting started with C.
* Easy-to-read and complete user's manual.
* Works with all IBM and compatibles running MSDOS 2.0 (or later).
* Plus many other features.

YOU WIN!

For $10.00 more, we will include the source code for the C library functions (excluding transcendentals). For an additional $15.00, we will include our ISAM file handler in OBJ format (as published in the **C Programmer's Library,** Que Publishing). The discount prices for the library source and ISAM only apply at the time the compiler is purchased. Please add $4.00 to cover postage and handling. To order, call or write:

ECOSOFT INC.

Ecosoft Inc.
6413 N. College Avenue
Indianapolis, IN 46220
(317) 255-6476

MasterCard VISA AMERICAN EXPRESS

Eco-C (Ecosoft), MSDOS (Microsoft), UNIX (Bell Labs), CP/M (Digital Research), Z80 (Zilog), 8086, 8087, 8088 (Intel).

Circle 493 on reader service card

CopyWrite backs up IBM PC Software

Hundreds of the most popular copy-protected programs are copied readily. **CopyWrite** needs no complicated parameters.

Requirements: IBM Personal Computer or XT.
128k bytes of memory.
one diskette drive.
CopyWrite will run faster with more memory or another drive.

CopyWrite is revised monthly, to keep up with the latest in copy protection. You may get a new edition at any time for a $15 trade in fee.

CopyWrite makes back up copies to protect you against accidental loss of your software. It is not for producing copies for sale or trade, or for any other use that deprives the author of payment for his work.

To order **CopyWrite**, call with your credit card or mail a check for $50 US funds to:

Quaid Software Limited
45 Charles Street East, Sixth Floor
Toronto, Ontario, Canada M4Y 1S2
Telephone (416) 961-8243

Ask about **ZeroDisk** to run copy-protected software from a hard disk.

Higgins's comprehensive keyword system cross-references and lists all keyword-related information in each function, as well as in hard disk files created with other DOS 2.00 application programs such as *1-2-3* and *WordStar*. For all functions, context-sensitive help screens are a keystroke away. *Higgins* comes in single-user and LAN versions. List price: $395. Requirements: 256K, DOS 2.00, hard disk.
Conetic Systems Inc.
1800 S.W. First Ave. #180
Portland, OR 97201
503/227-0645

Qwiknet

Anyone unfamiliar with project management, especially on the PC, will benefit from *Qwiknet*'s simplicity. Packaged with a mouse, the program is designed to access most operating functions, pull-down menus, and help screens at the press of a button. A helpful menu on every screen shows the appropriate mouse-operated functions. The keyboard is reserved for data entry, or if you prefer, it can replace the mouse entirely.

Unlike most project management programs, *Qwiknet* makes extensive use of windows, which can be repositioned around the screen or layered on top of one another. You can move freely between windows to enter or edit project information. The program saves your changes in the size, location, and color coding (with a color monitor) of windows.

"Is now soon enough for you?"

Diamond Software has the most complete inventory going, and can deliver whatever you want, whenever you want.

In supplying corporations with quality software, we provide something our competition doesn't.

Everything.

The most complete selection of major business applications software packages and peripheral hardware from top manufacturers.

An experienced team of salespeople and technicians whose training and focus is business-oriented.

A pricing structure that's not only competitive, but one that incorporates quantity incentives and cumulative volume discounts to qualified accounts.

And much more. Please call us and see.

THIS MONTH'S SPECIAL PACKAGES

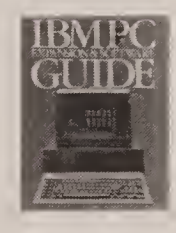
WordStar 2000/Lotus 123 $539
WordStar 2000 + /Lotus 123/dBase III $939
Hayes 1200/Crosstalk $509
AST 6 Pak 384K/Symphony $779
pfs File/Report/Write $239

THIS MONTH'S SPECIAL PRODUCTS

WordStar 2000/2000 + $call Lotus 123 $call
Multimate $269 AST 6 Pak 384K $369
R:Base 4000 $259 Volkswriter Dlx $159
Symphony $call Crosstalk $95
dBase III $call

	List	Sale
Alpha Software®		
Data Base Manager II	$295	**$call**
Electric Desk	$345	**$219**
Ashton-Tate®		
dBase II	$495	**$289**
Framework	$695	**$call**
Friday	$295	**$159**
Borland International®		
Turbo Pascal	$ 55	**$ 35**
Sidekick	$ 55	**$ 35**
Superkey	$ 69	**$ 42**
Decision Resources®		
Chartmaster	$345	**$249**
Signmaster	$245	**$179**
Digital Research®		
Concurrent PC DOS	$350	**$call**
CP/M 86	$100	**$ 65**
All Other Products		**$call**
Fox & Geller®		
Quickcode	$295	**$159**
Quickreport	$295	**$159**
dGraph	$295	**$159**
dUtil	$ 99	**$ 59**
Harvard Software®		
Harvard Project Mgr.	$395	**$239**
Total Project Mgr.	$495	**$269**
IBM Software®		
DOS 2.1/3.0	$ 65	**$ 55**
Displaywrite II	$299	**$255**
All Other Products		**$call**
Lifeboat®		
Lattice C Compiler	$595	**$309**
All Other Products		**$call**
MicroPro®		
WordStar	$350	**$179**
WordStar Pro Pack	$495	**$259**
MailMerge	$ 99	**$ 55**
CorrectStar	$145	**$ 79**
InfoStar/StarBurst	$295	**$149**
Pro Option Pack	$195	**$ 99**
Microrim®		
Clout	$250	**$149**
Extended Report Writer	$150	**$ 95**
Microsoft®		
Mouse	$195	**$139**
Word	$375	**$239**
Multiplan	$195	**$129**
Pascal Compiler	$300	**$199**
Fortran	$350	**$229**
C Compiler	$500	**$329**

	List	Sale
Microsoft®		
Chart	$250	**$155**
Project	$250	**$155**
Monogram®		
Dollars & Sense	$179	**$119**
Peter Norton®		
Norton Utilities (version 3.0)	$ 99	**$ 59**
Powerbase Systems®		
Powerbase	$395	**$call**
Rosesoft®		
Prokey	$129	**$ 89**
Samna®		
Word Plus	$695	**$389**
Satellite Software®		
Word Perfect	$495	**$249**
Software Publishing®		
pfs Report	$125	**$ 75**
pfs File	$140	**$ 85**
pfs Graph	$140	**$ 85**
pfs Write	$140	**$ 85**
pfs Plan	$140	**$ 85**
Sorcim/I.U.S.®		
General Ledger	$595	**$call**
Accounts Payable	$595	**$call**
Accounts Receivable	$595	**$call**
Inventory Control	$595	**$call**
Easywriter II System	$395	**$195**
Supercalc 3	$395	**$195**
Superproject	$395	**$199**
AST Research®		
Advantage	$895	**$call**
6 Pak Plus-64K	$395	**$259**
Reach Modem	$549	**$call**
All Other Products		**$call**
Hayes®		
Smartmodem 1200	$599	**$call**
Smartmodem 1200B	$549	**$369**
Smartmodem 2400	$895	**$call**
Hercules®		
Graphics Card	$499	**$319**
Color Card	$245	**$169**
Orchid Technology®		**$call**
Quadram®		
Quadboard Exp. to 384K	$395	**$259**
All Other Products		**$call**
Memory (64K)		**$ 29**



Get Que's New 5th Edition of the IBM PC Expansion & Software Guide, compliments of Diamond Software, with any purchase over $500.00

To order call toll free 1-800-227-0545

(In California call 415/633-2588) · Technical Department 415/633-2589 · International Telex 338139 (attn: 149) · Software Specialists for the IBM PC

Special Corporate Incentives · IBM®, CPM®, Apple® Formats
Same Day Shipment · Visa, M/C, American Express
Overnight Delivery Available · Free UPS Service With Prepaid Check
Purchase Orders Accepted from Qualified Organizations

Diamond Software

Whatever you want, whenever you want it.

7916 Capwell Drive, Oakland, CA 94621

CPM is a trademark of Digital Research
Apple is a trademark of Apple Computer Inc IBM is a trademark of International Business Machines

Circle 58 on reader service card

TOGETHER, STOPPING YOU.

RUN-TIME VERSION AVAILABLE

THERE'S NO

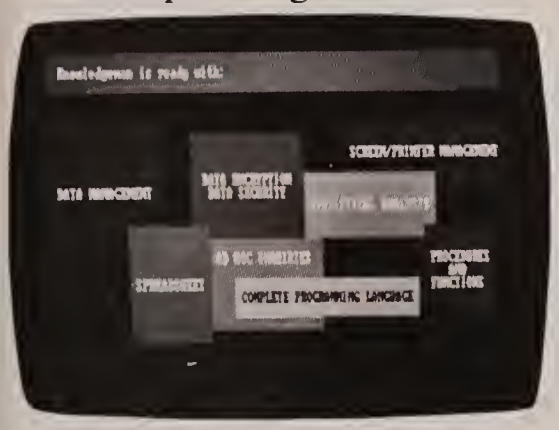
KnowledgeMan™ and You. The possibilities are endless.

To succeed in business, you need a partner that's fast, flexible, intelligent and easy to work with. A partner that can help turn your big ideas into well-conceived reality. One that gives you the support you need to make critical decisions confidently.

No partner can give you more of what you need than KnowledgeMan, the knowledge management software from MDBS.

A powerful partner.

KnowledgeMan helps you manage more knowledge, in more ways, than ordinary software. It can help you make better decisions on just about everything from production scheduling to financial planning to market



forecasting. KnowledgeMan and its optional components offer data management, spreadsheet analysis, statistical analysis, text processing, forms management, business graphics, programming and more.

The key to KnowledgeMan's versatility is its exclusive synergistic integration, allowing you to accomplish your computing needs within one program. Unlike other software, there's no need to exit one function before entering another. The result: different kinds of processing can be intermingled. Quickly and easily.

A partner that speaks your language.

For all of its power and sophistication, KnowledgeMan is remarkably simple to understand. Even a beginner can start putting KnowledgeMan to work in minutes. With a single query, you can obtain related data from unlimited multiple tables. You can even teach KnowledgeMan to understand your own jargon.

A partner that helps you along.

The on-line HELP facility allows you to draw on 6800 lines of helpful information organized into 380 screens. If you have a problem or question, KnowledgeMan allows you to access the pertinent HELP screen immediately. Each screen is carefully designed to provide a quick reference guide to KnowledgeMan commands.

A partner that gives you room to grow.

Ordinary software packages can be frustratingly easy to outgrow. Not KnowledgeMan. Each KnowledgeMan component has more power than you'll probably ever need—far more than conventional integrated programs. With KnowledgeMan, you don't sacrifice capability, capacity or convenience. So with KnowledgeMan, you spend your time solving problems—not trying to overcome software limitations.

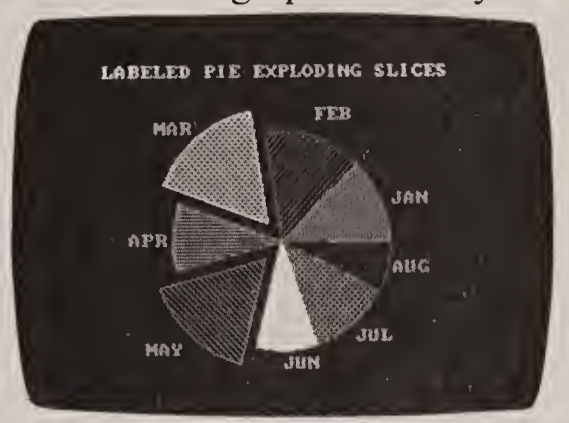
A partner that protects your interests.

KnowledgeMan offers sophisticated security features. Unauthorized access to data is next to impossible, thanks to password checking, thousands of access code combinations and data encryption.

So your secrets are safe with KnowledgeMan.

A partner you can build on.

To add yet another dimension to KnowledgeMan's capabilities, you can get fully-integrated options like K-Graph, an extensive business graphics facility that



lets you plot information in a variety of colorful graphs, charts and diagrams. For text processing, the K-Text option lets you incorporate data into written documents quickly and easily. Or, create highly-polished, full-color customized forms with K-Paint, our forms painting option. To short-cut the keyboard, put the K-Mouse option to work.

A partner you should get to know better.

To see KnowledgeMan in action, visit your dealer. Or contact Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902, (317) 463-2581, Telex: 209147 ISE UR.

It may be the beginning of a long, successful partnership.

Current version is 1.07 as of 9/10/84. KnowledgeMan, K-Graph, K-Paint, K-Text, and K-Mouse are trademarks of Micro Data Base Systems, Inc. MDBS is a registered trademark of Micro Data Base Systems, Inc.

KNOWLEDGE man™

The Knowledge Management Software from MDBS

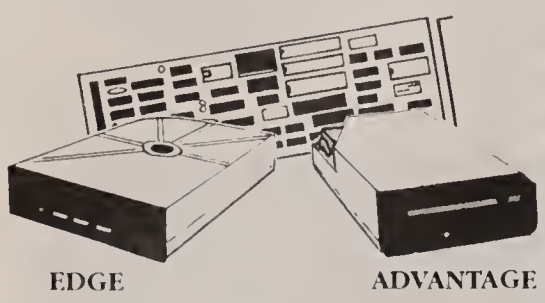
Operating Systems: PCDOS, MSDOS, CP/M-86. Minimum RAM required: 192K. K-Graph: PCDOS only.

Circle 233 on reader service card

HARD DISK STORAGE AND BACKUP

Creative Advantage
5 MB REMOVABLE HARD DISK Special **$895**

This removable cartridge drive is ideal for additional storage and backup! Includes drive, cartridge, controller, cables, manual and one year warranty. (Additional cartridges $85)



Creative Edge **$695**
10 MB HARD DISK

- includes 10 MB drive, controller, cables, & installation instructions
- one year warranty

HARD DISK	INT.	*EXT.
5Mb Removable	895	1045
10Mb Half-hgt	695	845
20Mb Half-hgt	995	1145
20Mb Full-hgt**	1195	1345
30Mb Full-hgt**	1495	1645

Externally mounted with fan and power supply
Includes ext. power supply

SIGMA DESIGNS **$695**
EXPANSION CHASSIS

- includes chassis, power supply, 9-slot backplane, 2 interface boards & cable

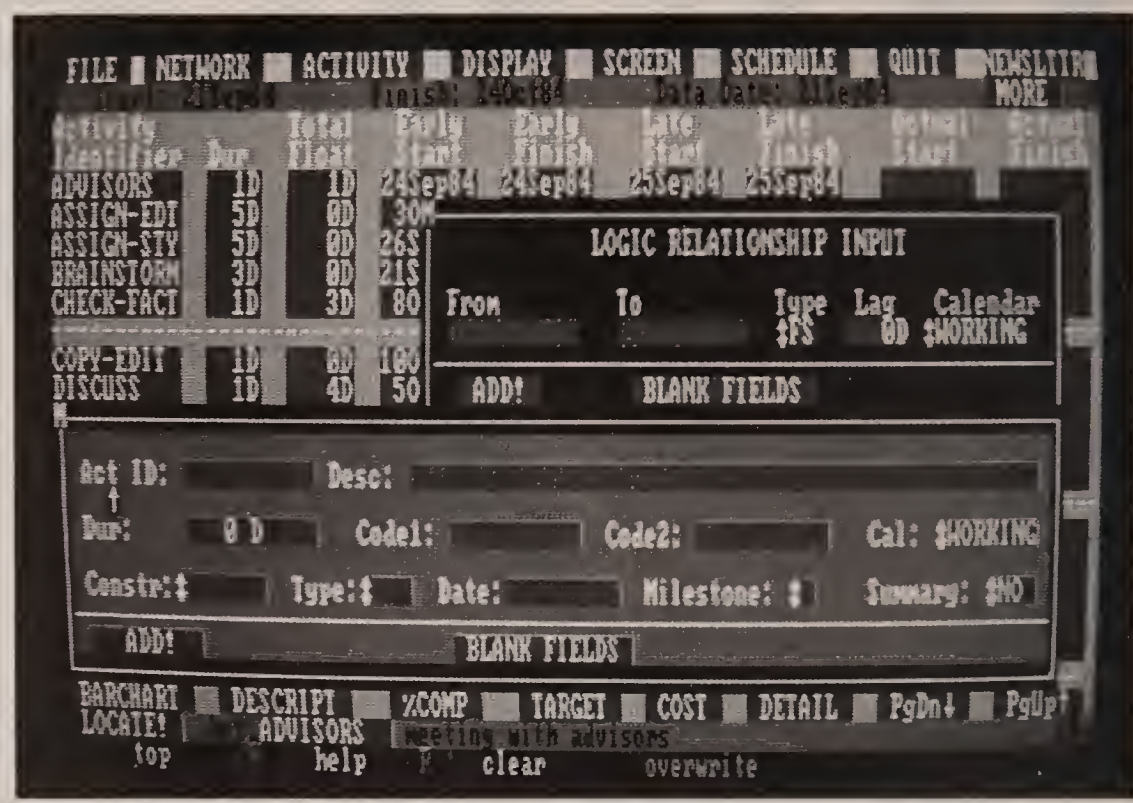
COLOR 400 NEW! **$595**

- 16 Color, 640x400 non-interlaced display
- Runs Lotus 123, Supercalc, etc. at twice their normal resolution
- Separate character sets for emulation and high resolution modes

COLOR 400 W/MOUSE . $ 695
COLOR 400 W/SR-12 . . . $1150
COLOR 400 W/TAX 440 $1150
45MB TAPE BACK-UP $995

Creative Microsales
(415) 945-1201
(800) 321-3324
3339 Vincent Road
Pleasant Hill CA 94523
VISA

Circle 110 on reader service card



Qwiknet, Project Software & Development

Qwiknet uses both Gantt and CPM (critical path method) techniques to track schedules, resources, and costs. The program prints 21 standard reports, including bar charts and resource histograms. Printers supported include the IBM Graphics Display Printer, the Epson FX-100, and Okidata's models 84, 92, and 93. List price: $895. Requirements: 384K, two disk drives, DOS 2.00, parallel port, serial port.

Project Software & Development, Inc.
14 Story St.
Cambridge, MA 02138
617/661-1444

Data Management

Reflex

Reflex occupies a realm somewhere between spreadsheets and data base managers, blending desirable qualities of both for easier data analysis. The program is unusual in that it presents data in five formats, or "views": Form, List, Graph, Crosstab, and Report. Up to three views can share the screen, showing different perspectives of the same information.

Reflex's Form view displays forms (data base records) that contain up to 128 fields. Field lengths do not need to be predefined and are changeable at any time. *Reflex* forms allow for calculated fields, which compute data from other fields within the same form using any of 50 built-in formulas. The List view organizes records and fields of your choosing in a row-and-column format. In the Graph view, *Reflex* creates five types of graphs. To examine supporting data, you move the cursor to a location on a graph,

free at last

FROM FIXED FIELDS, FIXED RECORDS, AND LIMITED INDEXES

ask Sam

an easy-to-use
state of the art
text-oriented data base management system
for business and home
from

Seaside Software

introductory price
$149.95

with

ask Sam

you put whatever you want
anywhere on the screen for each of your records
you access your files with a simple yet powerful access language
as you retrieve you change anything you want with a full screen editor
you make batch retrievals and/or updates with stored **askSam** programs
the HELP facility is an **askSam** file — therefore — you can quickly get any help you want
(**askSam** comes with a thirty-day, money-back satisfaction guarantee**)

TECHNICAL OVERVIEW

um Requirements: 128 K single disk drive for the IBM PC, PCjr, XT, AT* and compatibles PC DOS 2.0 or later.
form variable length records (to 20 screen lines in size) • All combinations of keyword vals including "and," "or," and "not" can be made • Retrievals can contain wildcards and l operators • Retrievals can be routed to the screen, printer or disk • Retrievals can be l on any field or fields • Words and groups of words can be treated as fields for retrieval, e, and computation • Retrievals and batch updates can contain arithmetic expressions with 13-digit precision • Can exchange ASCII files with other systems • Mostly menu • File size limited only by disk space • If you have a color monitor, you can color code iles • Written in C

USES

esses • accounts payable / receivable • bibliographies • billings • budgets dars • catalogues • collections • concordance • client information • diaries nses • filing • genealogies • home records • inventories • idea processing g lists • payments • personal records • price lists • queries • recipes • research rs • social registers • thesaurus • your imagination is the only limit

ORDER TODAY

_____ I want **askSam** @ $149.95 introductory price
plus $5.00 handling and shipping
Texas residents must add 5-1/8% sales tax
Outside North America add $15.00

I will pay by check____ money order____ VISA____ Master Card____
card #_____ expiration date_____
I will use **askSam** on my PC____ PCjr____ XT____ AT____ Other____

NAME _____
ADDRESS _____
CITY/STATE/ZIP _____
TELEPHONE _____

For VISA and MasterCard orders **only** call
1-800-3-ASKSAM
or in Texas 1-512-991-2019

Write for free brochure • Dealer and distributor inquiries welcomed

Seaside Software
538 Parade Corpus Christi, Texas 78412

PCjr, XT, AT: trademarks of IBM

Circle 920 on reader service card

** Less 15.00 service charge

Asher™ by Quadram. Turn your IBM® PC into a productive voice/data terminal.

Asher. Communications management for your computer and you.

Organize your personal and business communications quickly, effectively. With Asher by Quadram. Snap Asher inside your PC for a system that works the way you do. Asher begins by partitioning system memory. Load all your programs (Wordstar,* Lotus 1-2-3,* you name it) just once then toggle between them when your work calls for it. With Asher, program selection is just a keystroke away.

Asher turns your PC into a full-featured telephone.

Asher lets your PC become a computerized telephone, too. Packed with all the features you'd find in an advanced electronic key phone. Place voice calls through the Asher handset (works just like a desk phone) and exchange files or send a screen to other systems through the Asher modem. With Asher, you can even talk and send data during the same call.

Plus, Asher comes with an electronic calendar to track your daily schedule (It even beeps you when an appointment time arrives). And a card file that lets you record telephone numbers and data from all your business transactions.

Effective communications management for any business environment.

Asher's power and ease-of-use (most functions are executed with a single keystroke) make it ideal for any business environment. Because Asher integrates your system. Now™ you can place a voice call, call up a data base on your screen and transmit information to another system all in the same operation. It's effective communications management at its best.

QUADRAM QUALITY

Visit your local authorized Quadram dealer today and see how Asher (and that famous Quadram Quality) can go to work for you. Asher. Powerful communications management for your personal computer and you.

QUADRAM™
An Intelligent Systems Company

4355 International Blvd./Norcross, Ga. 30093
(404) 923-6666/TWX 810-766-4915 (QUADRAM NCRS)

INTERNATIONAL OFFICES
Interquadram Ltd. 442 Bath Road, Slough, England SL1 6BB Tel 6286-63865 Tlx 847155 Aurema G **Interquadram GmbH** Fasanenweg 7, 6092 Kelsterbach, West Germany Tel 6107-3089 Tlx 417770 Seva G **Interquadram s.a.r.l.** 41, Rue Ybry, 92522 Neuilly Tel 758-1240 Tlx 630842 Iso Bur **Chevco Computing** 6581 Kitimat Road, Mississauga, Ontario, Canada L5N-2X5 Tel 416-821-7600

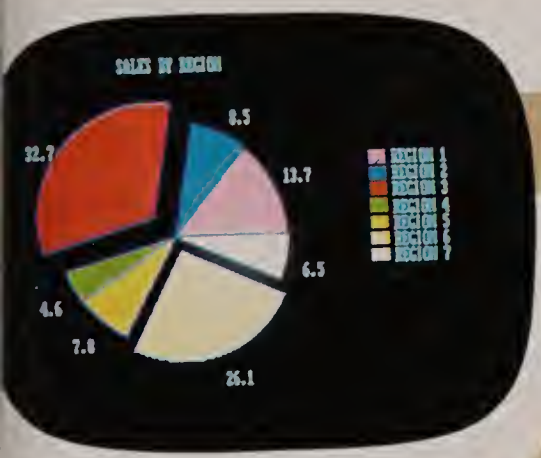
© Copyright 1984 Quadram Corporation
All Rights Reserved

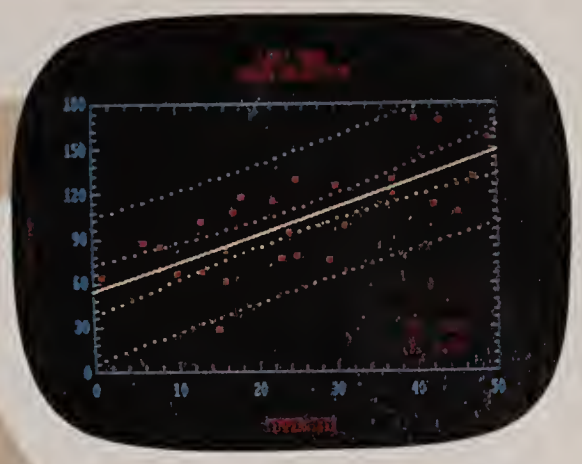
Circle 149 on reader service card

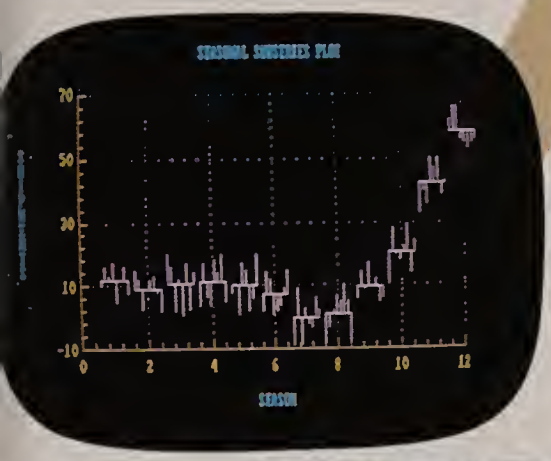
*Wordstar is a registered trademark of MicroPro Inc. 1-2-3 is a registered trademark of Lotus Development Corp.
IBM® PC is a registered trademark of International Business Machines Corporation

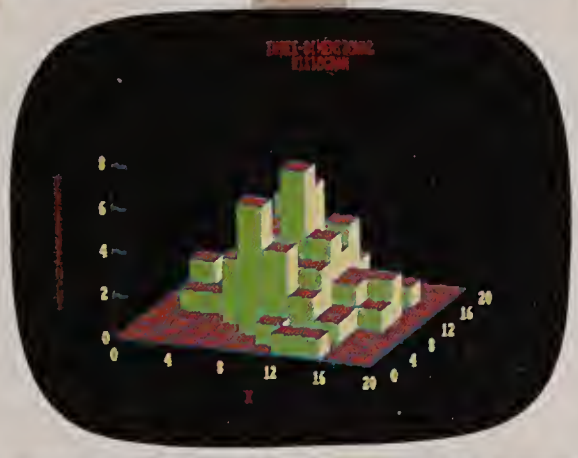
STATGRAPHICS.®

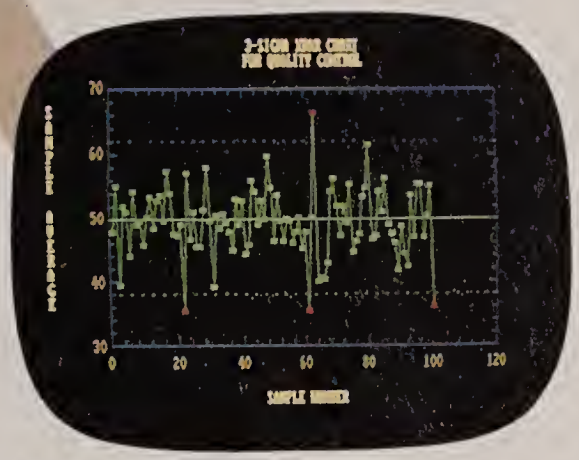
ONE KEYSTROKE TURNS LIFELESS DATA...











INTO VITAL STATISTICS.

Data. You live with it every day. What you need are the tools to make it come alive. Comprehensive analytical tools. Mathematical precision. And graphics capabilities to broaden your insights—to help you visualize, analyze, and communicate your findings quickly and convincingly.

And now you've got it. With STATGRAPHICS—a new PLUS★WARE™ product from STSC. STATGRAPHICS is the only PC software to fully integrate a wide variety of statistical functions with high-resolution color graphics. Giving you the power and precision you used to find only with mainframe software.

STATGRAPHICS' unique interactive environment allows you to generate graphs from within the statistical procedures. You can change a variable and see the effect—immediately. So your job is easier and you're more productive.

MORE OPTIONS FOR MORE COMPREHENSIVE ANALYSIS.

STATGRAPHICS features over 250 functions for analyzing data—including analysis of variance, regression analysis, experimental design, quality control procedures, multivariate techniques, nonparametric methods, and extensive forecasting and time series analysis.

It also lets you enter data at the keyboard or access data stored in standard ASCII files, LOTUS® 1-2-3 worksheets, and DIF files used by other popular software packages.

TELL A CLEARER, MORE DRAMATIC STORY.

STATGRAPHICS includes a wide variety of graphics programs such as two and three-dimensional line and surface plots, bar and pie charts, histograms, time sequence plots, and quality control charts.

The graphics are supported on color and monochrome graphics boards, dot-matrix printers, and pen plotters for presentation quality graphics.

SOPHISTICATED STATGRAPHICS IS SURPRISINGLY SIMPLE TO USE.

STATGRAPHICS is completely menu-driven, and includes a comprehensive user's guide, online HELP screens, tutorial, and handy reference card. And STSC's HELP-Line is only a phone call away—giving you ready access to our staff of technical experts.

TAKE A LOOK AT STATGRAPHICS. AND LOOK NO FURTHER.

STATGRAPHICS is the most advanced statistical graphics software available for PC's. And the complete system is just $695.

To order STATGRAPHICS, or for more information, contact your local dealer or call **800-592-0050** (in Maryland, **301-984-5123**). Or write STSC, Inc., 2115 E. Jefferson St., Rockville, MD 20852. Major credit cards accepted.

Problem-solving at the speed of thought.

STSC
A Contel Company

STATGRAPHICS operates on IBM PC's and compatibles under DOS, Version 2.0 or later. A minimum of 384K RAM, a graphics adapter and compatible monitor, and two double-sided disk drives or a hard disk are required. An 8087 math coprocessor and 512K RAM are recommended.
STATGRAPHICS is a registered trademark of Statistical Graphics Corporation. PLUS ★ WARE is a trademark of STSC, Inc. LOTUS is a registered trademark of Lotus Development Corporation.

Circle 282 on reader service card

For bright new ideas in personal computing...

...subscribe to PC WORLD today.

You'll save $23 and ensure access to the best new ideas in business and personal computing!

YES! Enter my subscription for 12 issues of *PC World* at just $11.97! I'll save $23 off the single copy price and $11 off the basic subscription rate.

☐ Bill me ☐ Payment enclosed

☐ New subscription ☐ Renewal

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272)

Name _____

Company _____

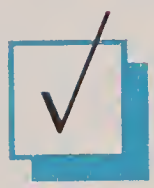
Address _____

City, State, Zip _____

Basic subscription rate: $23.75/year (12 issues). Single copy price: $35.40/year. Please allow 6 to 8 weeks for shipment of your first issue. Outside the U.S. orders must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25/year for surface mail or $100/year for airmail. Offer expires September 30, 1985.

PC WORLD

3 JHCA7



YES! Enter my subscription for 12 issues of *PC World* at just $11.97! I'll save $23 off the single copy price and $11 off the basic subscription rate.

☐ Bill me ☐ Payment enclosed

☐ New subscription ☐ Renewal

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272)

Name _____

Company _____

Address _____

City, State, Zip _____

Basic subscription rate: $23.75/year (12 issues). Single copy price: $35.40/year. Please allow 6 to 8 weeks for shipment of your first issue. Outside the U.S. orders must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25/year for surface mail or $100/year for airmail. Offer expires September 30, 1985.

PC WORLD

3 JHCA7

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621

NO POSTAGE
NECESSARY
IF MAILED IN
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 63 BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621

Sales $

Views Services Edit Database Filter Crosstabs

CROSSTAB

Function: @SUM Field: Sales $

Rep	Product: "Diesel"	"Industrial	"Low-power"	"Standard"	ALL
"Beaman"	71,420	111,895	74,245	82,615	340,175
"Carlick"	65,765	201,915	73,494	77,505	418,679
"Davis"	51,265	77,340	56,570	58,980	244,155
"Reynolds"	68,445	149,230	79,380	84,735	381,790
ALL	256,895	540,380	283,689	303,835	1,384,799

Crosstab view, Reflex, Analytica

and with one keystroke the representative form or list appears in an adjacent window. The Crosstab view provides a numeric cross-tabulation that summarizes data (for example, total sales for each region by month). Cross-tabs are usually found only in statistics packages; *Reflex* is the first data base or spreadsheet program to offer this feature. The Report view produces customized reports with user-defined specifications that may include calculated fields. Once you create a report, *Reflex* can save the format and reprint it after you enter new data—useful, for example, in a monthly sales report.

Both the *Reflex* program and the data base are resident in RAM, which increases sort speed but limits the size of the data base. Pull-down menus and context-sensitive help messages are available throughout the program. *Reflex* imports DIF and ASCII files and data created with *1-2-3*, any *pfs:* program, or *dBASE II;* and it exports text in ASCII format. *Reflex* supports a range of printers and plotters for output of all five views. List price: $495. Requirements: 384K, two disk drives, DOS 2.00, graphics board.
Analytica Corp.
3155 Kearney St.
Fremont, CA 94538
415/490-3643

Integrated Applications

Ability

Ability is a menu-driven integrated program that stands out from the crowd with two unusual features: Presentation! and Library. On the same disk with Library are the

More people have survived cancer than now live in the City of Los Angeles.

We are winning.

Please support the AMERICAN CANCER SOCIETY®

85 REASONS TO CALL IN 1985!

FLOPPY DISK DRIVES

TANDON TM 100-2 (DS/DD) $150
CDC (DS/DD) 150
TEAC 55B ½ height 139
PANASONIC ½ height 129

HARD DISK DRIVES

SHUGART (internal 10mb) $699
ALPHA OMEGA TURBO 10 (internal 10mb) 799
PEGASUS 10mb, 23mb, 40mb, 65mb, 140mb ..... CALL!
IOmega 10mb 2295
IOmega 20mb 2895

MONITORS

AMDEK 300A/G $145/135
AMDEK 310A 175
PGS HX12 469
PGS SR12 ..... CALL!
PGS MAX12 189
Quadram Quadchrome II 429
QUADRAM AMBERCHROME 169
TAXAN (all models) ..... CALL!

MONITOR INTERFACE CARDS

PLANTRONICS COLOR + ... $389
PC PEACOCK 219
PARADISE MODULAR GRAPHICS ..... CALL!
PARADISE MULTI-DISPLAY ..... CALL!
HERCULES GRAPHICS 329
HERCULES COLOR 199
VUTEK (C, P, S) 219
QUADRAM QUADCOLOR I 215
PERSYST MONOCHROME 189
PERSYST COLOR 189
PERSYST BoB 449
TECMAR GRAPHICS MASTER 469
EVEREX GRAPHICS EDGE 399

MULTI-FUNCTION BOARDS

AST SIXPACPLUS w/64k $259
QUADRAM QUADBOARD w/64k . 259
TECMAR CAPTAIN w/64k 259
ORCHID PC BLOSSOM 269
APPARAT 256k/512k ..... CALL!
64k RAM UPGRADE 39
256k RAM Chip Set 135

MODEMS

HAYES SMARTMODEM 1200 ... $439
HAYES SMARTMODEM 1200B ... 399
HAYES SMARTMODEM 300 199
NOVATION MODEMS ..... CALL!
SIGNALMAN MARK VII 129
SIGNALMAN MARK XII 259
ANCHOR VOLKSMODEM 79
RIXON (ALL MODEMS) ..... CALL!

SOFTWARE

LOTUS 1-2-3 ..... BEST PRICE!
SYMPHONY ..... BEST PRICE!
dBase III $435
dBase II 299
WORDSTAR PRO 329
WORDSTAR 2000 280
OPEN ACCESS ..... CALL!
MULTIMATE ..... CALL!
HAYES SMARTCOM II ..... CALL!
CROSSTALK 108
IUS ..... CALL!
NORTON UTILITIES 3.0 65
FRAMEWORK ..... CALL!

MISCELLANEOUS

KEYTRONICS 5151 ..... $189
MICROSOFT MOUSE 139
PC MOUSE 129

PRINTERS

OKIDATA 82 ..... $299
OKIDATA 83 565
OKIDATA 84 699
OKIDATA 92 389
OKIDATA 93 599
EPSON RX 80 249
EPSON RX 80FT ..... CALL!
EPSON RX 100 415
EPSON FX 80 429
EPSON FX 100 ..... CALL!
EPSON LQ 1500 1139
GEMINI 10X 259
GEMINI 15X 369
DIABLO (ALL MODELS) ..... CALL!
DYNAX (ALL MODELS) ..... CALL!
TOSHIBA 1340 745
TOSHIBA 1351 1289
QUME (ALL MODELS) ..... CALL!
NEC (ALL MODELS) ..... CALL!
SILVER REED 400 259
SILVER REED 500 339
SILVER REED 550 425
SILVER REED 770 759

Please call for current prices. Dealer inquiries welcome. Qualified purchase orders accepted.

1/800/631-6993
(FOR ORDERS ONLY)

1/404/953-0088
(INFORMATION AND TECHNICAL SUPPORT)

MASTERCHARGE
VISA
ACCEPTED

CALL TODAY . . .
404/953-0088

PC

2800 Delk Road • Marietta, Georgia • 30067

Circle 737 on reader service card

BUYERS GUIDE TO DESKTOP ORGANIZERS

A COMPARISON OF THE MOST POPULAR PRODUCTS

	PolyWindows Desk	Sidekick	Spotlight
ROLODEX-TYPE FILES			
Variable Card Size	**YES**	NO Files	NO
Multiple Card Decks	**YES** (1-10)	NO Files	**YES**
Number Cards Per Deck	**RAM Limit**	NO Files	500 Max.
Max. Characters Per Card	**969**	NO Files	480
Search	**YES**	NO Files	**YES**
Auto Alphabetize	**YES**	NO Files	**YES**
Print Card	**YES**	NO Files	**YES**
Print Deck	**YES**	NO Files	**YES**
CALENDAR			
Daily Notes	**YES**	NO	NO
Mark Important Days	**YES**	NO	NO
Date Range	**1752-2099**	1901-2099	1901-2099
APPOINTMENT BOOKS			
Multiple Appt. Books	**YES** (1-10)	NO	NO
"Things To Do" List	**YES**	NO	NO
Print Appointment Book	**YES**	**YES**	**YES**
ALARM CLOCK			
Display Time	**YES**	NO Alarms	**YES**
Hourly Chimes	**YES**/Optional	NO Alarms	NO
Time Format	**AM / PM**	NO Alarms	AM / PM
Display Alarm Message	**YES**	NO Alarms	NO
Number of Alarms	**9**	NO Alarms	Many
CALCULATOR			
On-Screen Tape	**YES**/Optional	NO	NO
Printing Tape	**YES**/Optional	NO	NO
Percentage Function	**YES**	NO	**YES**
Display With Commas	**YES**/Optional	NO	NO
Floating/Fixed Decimals	**YES/Both**	Fixed	Floating
Memory	**YES**	**YES**	**YES**
Insert Result in Work	**YES**	**YES**	**YES**
Max. Display Digits	**15**	18	12
Display Number > Above	**YES/Exponential**	NO	NO
Scientific Notation	**YES**	NO	NO
Binary/Hexadecimal	NO	**YES**	NO
NOTEPAD			
Multiple Documents	**YES** (1-10)	NO	NO
Word Wrap	**YES**	NO	**YES**
Merge Files	**YES**	NO	NO
Change Margins	**YES**	NO	NO
Variable File Size	**YES**	**YES**	NO
File Size Limit	**64K**	50K	4.4K
Variable Window Size	**YES**	**YES**	NO
Print Document	**YES**	**YES**	**YES**
Print Window Only	**YES**	**YES**	**YES**
Undelete Key(s)	**YES**	**YES**	NO
Cut & Paste Screen Text	NO (Note 1)	Import Only	NO
KEYBOARD ENHANCER			
Number Keys Redefined	**YES Up to 60**	NO/Not Avail.	NO/Not Avail.
Total Keystrokes	**YES** 2500	NO/Not Avail.	NO/Not Avail.
GENERAL CHARACTERISTICS			
100% Memory Resident	**YES**	NO	NO
Minimum Memory Used	**35,500**	61,300	77,200
Typical Memory Used	**50,000-75,000**	61,300	77,200
On-Line Help	**YES**	**YES**	**YES**
Moveable Windows	**YES**	**YES**	NO
Redefine Colors	**YES**	**YES**	**YES**
Expandable/Add Functions	**YES**	NO	NO
Can Remove Functions	**YES**	NO	NO
Integrated Interface	**Excellent**	Good	Good
Visual Appeal	**Excellent**	Fair	Poor
Speed	**Very Fast**	Fast	Slow
ADD-ON FUNCTIONS			
Auto Dialer	NO (Note 2)	**YES**	**YES**
DOS Functions	NO (Note 1)	NO	**YES**
Game	**YES**	NO	NO
ASCII Chart	NO	**YES**	NO
COST - PROTECTED	**$49.95**	$54.95	$149.95
COST - UNPROTECTED	**$84.95**	$84.95	NO/Not Avail.

Note 1: **"PolyWindows DOS"** add-on available soon at extra cost to add cut & paste and many additional functions.

Note 2: **"PolyWindows Phone"** add-on available soon at extra cost to add auto-dial, phone log, cost computation, etc.

Say Yes! to PolyWindows Desk and

No! to Sidekick and Spotlight.

Thousands of PC users are choosing PolyWindows Desk over Sidekick and Spotlight every week.

It's easy to see why.

Other Desktop Organizers either totally ignore some of your basic Desktop needs, or are inflexible and cumbersome.

Say Yes! to PolyWindows Desk, the smarter, faster, *better* Desktop Organizer.

"PolyWindows is better than Sidekick. It is not only easier to use, it offers the promise of related add-on products."

Charles Humble,
High-Tech Business Columnist

Available at better dealers nationwide
or order with VISA or MasterCard by calling

1-800-547-4000 Dept. 305

Oregon & Foreign orders call 503-684-3000 or send checks to: POLYTRON Corp., Dept. 305, P.O. Box 787, Hillsboro, OR 97123.

Copyprotected $49.95
Non-Copyprotected $84.95

Plus $4.00 Shipping
Outside North America add $10.00

30 Day Money Back Guarantee

PolyWindows DESK

PolyWindows Desk was written by Thomas A. Crispin.
Works with IBM PC, XT, AT & true compatibles.
Requires DOS 2.0 or later, TopView Compatible.

POLYTRON

High Quality Software Since 1982.

yWindows Desk, Sidekick, Spotlight are trademarks of POLYTRON Corp., Borland International Software Arts, respectively.
pView and Rolodex are trademarks of IBM and Rolodex Corp. respectively. ©1985 POLYTRON Corp.

Circle 804 on reader service card

Presentation! function, Ability, Xanaro Technologies

more typical data base management, spreadsheet, graphics, word processing, and telecommunications functions. Presentation! is on a separate disk.

Library serves as a DOS shell for eight DOS commands and also lets you swap program disks in order to work with other application programs without exiting *Ability*. Library displays a table of contents that lists the files created by each integrated function as well as by other programs. Presentation! lets you create an on-screen slide show (for which a color

Last year the experts tested the top-of-the-line Toshiba 3-in-One™ printer.

Here's what they said.

"When Toshiba America called to see if there were problems testing their printers, I responded, 'You bet—I can't get the P1351 off Bill Machrone's desk long enough to get its picture taken!' It's that good."

(Bill Machrone is the editor of PC Magazine.)

PC Magazine
November 27, 1984

"It is setting new standards for quality and performance in the dot matrix arena."

Computers & Electronics Magazine
November 1984

monitor is required) by choosing from a selection of 20 icons, 7 letter sizes with one font, 25 musical tunes such as "Happy Birthday," and 8 movie-like transition effects. These features can be combined with graphs, text, or a spreadsheet.

Ability has other attractions as well. As with any well-integrated program, it updates all functions when changes are made in one. In the data base function, *Ability* limits the number of records by the amount of disk storage rather than unused RAM (unlike the methods used by *Symphony* or *Framework*). You can add or delete fields at any time. The graph function creates line graphs, vertical and horizontal bar charts, and regular and exploded pie charts. The communications function features data encryption for security as well as DEC VT52 and VT100 terminal emulation. The word processor's cut-and-paste feature lets you combine text with data from the other functions for use in a printed report. List price: $495. Requirements: 256K, two disk drives; color graphics board and color monitor for Presentation!.

Xanaro Technologies, Inc.
321 Bloor St. E #815
Toronto, Ontario
Canada M4W 1G9
416/927-8369

Just Announced *uses information provided by manufacturers. These descriptions do not constitute reviews.* Just Announced *does not evaluate products or corroborate manufacturers' claims. Manufacturers: Send a description and a photograph of your new product along with complete system requirements (memory, disk drives, display, and software) and pricing information to* Just Announced, PC World, *555 De Haro St., San Francisco, CA 94107.*

"

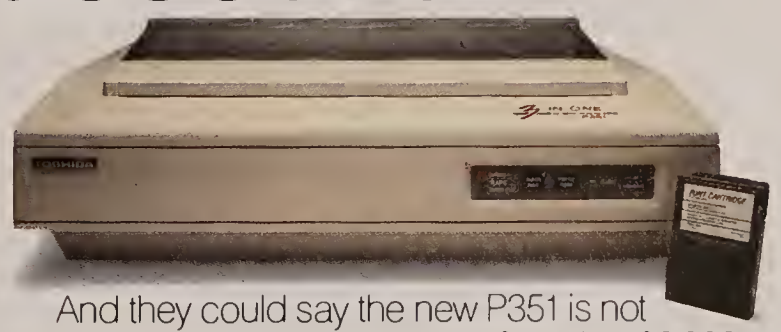
Imagine what they will say about its successor.

The New Toshiba P351 3-in-One printer. They could say that inside the sleek new Toshiba P351 you'll find the ultimate 3-in-One printer. Because it offers a combination of:

Letter-quality printing. Perfectly translated graphics. And speed. (100 cps letter. And draft speed improved to 288 cps.)

They could say you'll appreciate the 24-pin dot matrix head that gives the P351 its exemplary letter and graphic quality.

They could say the new P351 gives you an almost unlimited number of ways to express yourself. With both downloadable software fonts and new plug-in font cartridges.



And they could say the new P351 is not only the best looking printer in the $1,000 to $2,000 range. But also the most reliable.

Of course, we're not putting words in their mouths. Just the ultimate 3-in-One printer in their hands. And yours.

For complete information call 1-800-457-7777, Operator 32.

In Touch with Tomorrow

TOSHIBA

TOSHIBA AMERICA, INC. Information Systems Division

Circle 285 on reader service card

Which electronic mail service delivers much more than mail?

Every one of these electronic mail services does a very good job of delivering the mail.

But only one delivers so many more online services with equal expertise.

The Source.

With The Source, you can have the daily news delivered along with your daily mail. Make airline reservations. Trade stocks. Hold a computer conference. Communicate with thousands of people who share your interests.

Even get the latest word on new hardware and software products, in seconds.

All this, and more, along with the electronic mail service called "the most powerful available anywhere."

And all for just $49.95, plus reasonable hourly usage fees.

Call 800-336-3366* and you can have the power of The Source working for you in a matter of minutes.

Or for more information, visit your nearest computer dealer or mail the coupon below.

Please send me more details about The Source.

Name Telephone #

Address

City State Zip

☐ yes ☐ no I own a personal computer

Mail to: Source Telecomputing Corp.
1616 Anderson Road
McLean, VA 22102

7824H11

INFORMATION NETWORK
The Source℠

The most powerful resource any personal computer can have.

The Source is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. The Source services are offered in participation with Control Data Corporation © Source Telecomputing Corporation, 1985. MCI Mail is a service mark of MCI Communications Corp. EasyLink is a service mark of Western Union.

*In Virginia or outside the continental U.S. call (703) 821-6666.

COMMUNICATIONS
SourceMail℠
Mailgram® Message Service
PARTICIPATE™ Computer Conferencing
CHAT Interactive Communications

NEWS & INFORMATION
News Bulletins
UPI News Service
Associated Press
Scripps-Howard News Service
Accu-Weather™
The Washington Post Electronic Edition
Sports
BYLINES Feature News

INVESTOR SERVICES
Portfolio Management
Delayed Stock Quotes
Real-Time Stock Quotes
Spear Securities Online Trading
Media General STOCKVUE
Donoghue Investment Newsletter
INVESTEXT Research Reports
Management Contents Publication Abstracts
Employment Services
UNISTOX Market Reports
Commodity World News
BIZDATE Business Magazine

PERSONAL COMPUTING
MICROSEARCH™ Hardware, Software Reviews
Member Directory
POST Bulletin Boards
Member Publications

TRAVEL SERVICES
Official Airline Guide
A-Z Worldwide Hotel Guide
Travel, Hotel Tickets & Reservations
Restaurant Guides
Travel Tips, Tours

SHOPPING & LEISURE
Movie Reviews
Comp-u-store Electronic Shopping
Games, Educational Quizzes

PHONE USER!!!

Your Desk should be

MY DESK.™

The only business desktop manager with integrated computer-phone/PBX hardware and software

MyDesk will run in the background on Your Desk.

MyDesk organizes your customer directory into a RAM based relational database for instant access from Your Desk (up to 15,000 entries).

MyDesk's Appointment Book set alarms and gives a visual reminder if you missed the chime at Your Desk.

MyDesk's Things To Do and Notepad better organize Your Day.

MyDesk's Calculator includes four memories, tape, and a notepad.

MyDesk times and logs calls made from Your Desk.

*Only if feature is available on phone line.

NO HIDDEN COSTS!!

MyDesk does not require an expensive modem to handle the largest activity center on your desk: Your Telephone.

Suggested retail: $199.00

MyDesk offers a growth path for Your Desk with a speaker phone option for hands free communication. (Available $99.95 & $10 s/h.)

MyDesk redirects calls for Your Desk while you are away.*

MyDesk conducts a three way conference while you are at Your Desk.*

MyDesk transfers calls from Your Desk to another desk.*

MyDesk dials Your Associates by name or relationship. It even redials if the line is busy.

MyDesk allows Your Desk to communicate with all major PBX's.

ORDER NOW! For Visa or Master Card orders call 800-235-6647/ext. 125 or 800-272-3360 in California, and 800-235-6646/ext. 125 or 800-292-3360 outside California. Add $10 for shipping and handling. Sorry no P.O.'s or C.O.D. orders.

Dealer/Distributor Inquiries welcome - call 408-977-0488

Free: MyTask (value $19.95) MAKE DOS MULTI-TASKING. Run any two popular programs at the same time. Maintain context and switch back and forth between the programs with one keystroke. MyTask is a dynamite tool that will significantly increase your productivity.

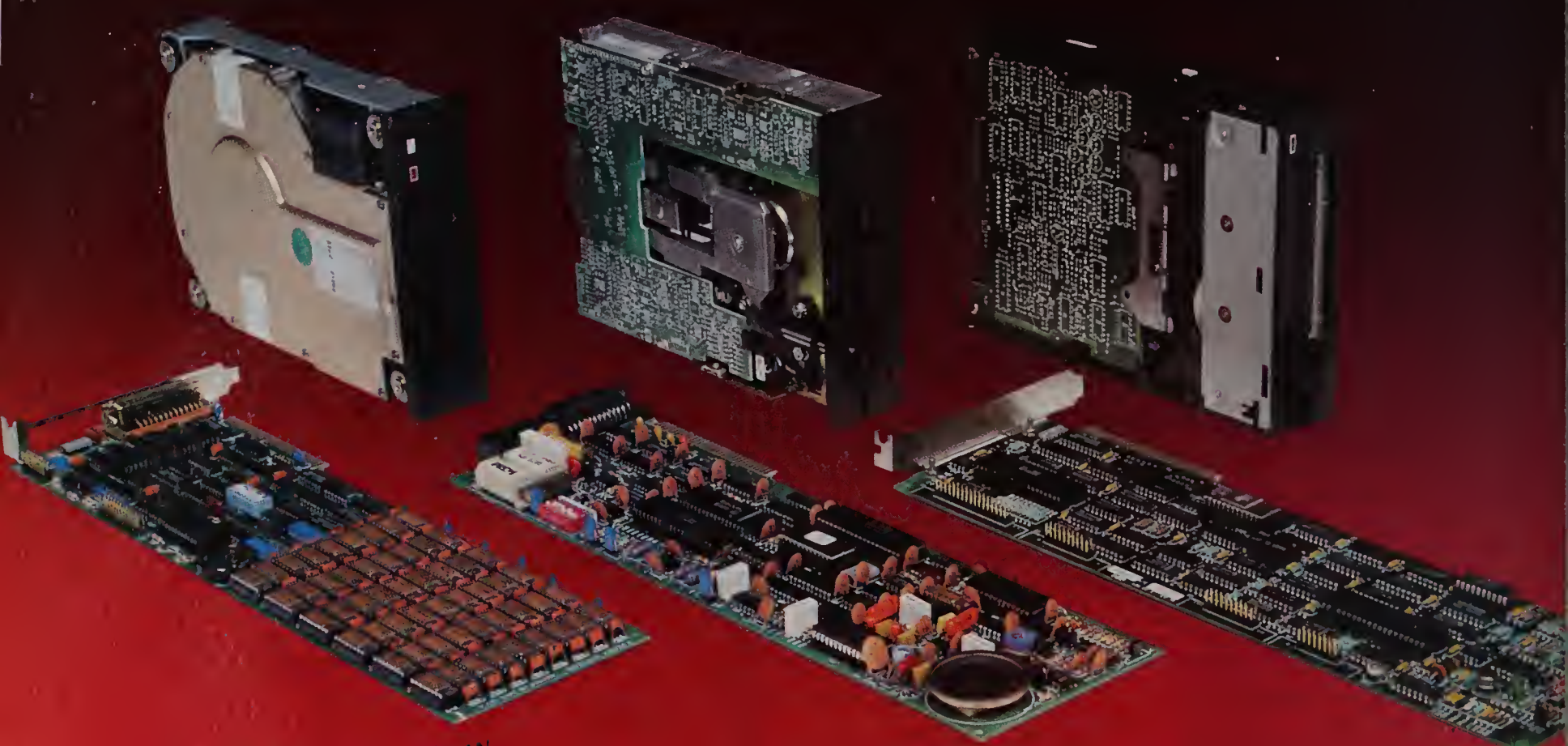
For PC, XT & true compatibles. Color monitor support. Will work with the standard push button telephones and multi-line telephones (with a multi-line controller). The Computer-Phone/PBX hardware does sophisticated telephone/PBX management. It is not a modem.

Third Floor Systems, Inc; 1630 Old Oakland Road, Suite A114; San Jose, CA 95131.

Circle 219 on reader service card

Why Would Anyone Pay More?

Highest Quality at the Lowest Price.



~~$599.00~~ Too Low To Quote!

Hard Disk Drive

- 10 MB internal subsystem
- Half-height with controller
- XT compatible
- Low power usage
- Software and cables included

$119.00

Floppy Disk Drive

- Half-height
- IBM compatible
- 360K, 48 TPI
- Double sided/double density

$725.00

Streaming Cassette Tape

- Half-height internal subsystem
- Quick back-up system
- Low power usage
- Software and cables included
- Image or file by file back-up

$199.00

Multifunction Card

- O-384K memory
- One parallel port
- One serial port
- One game port
- One clock calendar
- RAM disk
- Print spooler
- Clock utilities

$265.00

300/1200 baud Modem

- Auto speed detection
- Hayes and Bell 103/212 compatible
- Auto dial/auto answer
- On-board speaker
- Software volume control
- Internal plug-in
- FCC certified

Inquire about our graphics controller!

Shipping charges are extra.
Visa and MasterCharge, add 3% more.

JEDEN

1318 W. Sepulveda Blvd.
Harbor City, CA 90710

912 Barton Street East
Suite 26
Hamilton, Ontario
Canada L8L 3C2

In *USA* call:
(714) 545-8108

In *Canada* call:
(416) 549-2303

PC Pedestal 2; Original IBM PC tilt and swivel for color or monochrome monitor Retail – $49.95

Curtis Cables; For IBM and compatibles; Cables for keyboards, monochrome or color monitors, modems, printers Retail – $8.95-$57.95

UNI-1 Universal Base; Low profile, tilt and swivel monitor base Retail – $49.95

Portable Pedestal; Tilt and swivel base for Compaq and IBM portable Retail – $69.90

SS-1 System Stand; Holds PC and XT unit vertically Retail – $24.95

Electronic Surge Protection; Protects hardware and software Retail – $49.95-$89.95

6 Ways to get more comfortable with your computer.

Curtis products are available nationally from leading Dealers, Distributors and Retail Chains.
In Canada: Micro-Computer Products, P.O. Box 235, Ajax, ONT, Canada L1S 3C3, (416) 427-6612.

For the Dealer or Distributor nearest you call Curtis at (603) 924-7803.

Curtis Manufacturing Company, Inc., 305 Union Street, Peterborough, New Hampshire 03458.

TOLL FREE ORDERS ONLY! 800-631-0962
(INSIDE CALIFORNIA) 800-521-6162

Customer Service HOTLINE (408) 559-6555

GUARANTEED the LOWEST!

OUR PRICE GUARANTEE – It's Simple! We'll beat any ad in this magazine – same terms – call TOLL FREE for details!

DCC DISCOUNT COMPUTER CENTERS

OUR CUSTOMER SATISFACTION GUARANTEE: If for any reason your DCC purchase fails to meet manufacturers specifications within 30 days of purchase, please return it to us for a full refund or exchange of your choice! Sorry, software excluded due to copyright laws.

EPSON all models! RX/FX and LO1500 also NEW JX80 (7colors) — PRINTER SALE!!! models 82/83/84 and 92/93!! also 2410 (350 cps!) — **OKIDATA**

IBM PC or 2 drives/256K, 10 mg hard disk **$1650** 2 drvs 256K — **$2295** — **IBM XT** 10 mg. hard disk 256K, 1-360Kb drive only **$3395**

new models!! **HR-15 XL $359** **BROTHER** **LETTER QUALITY** **$799** · High Speed 36 cps · 7K Buffer **HR-35**

COMPUTERS

IBM PC & XT ..... See special above!!!
PC with 1 drive/64K 1395
PC with 2 drives/256K 1650
XT with 10 mg HD/128K 3350
XT with 2 drives/10MG 3475
Call for details – Compatible brand portables and desktops ..... NOW IN STOCK

MONITORS

IBM MONOCHROME 249
COLOR 569
AMDEK 300G 135
300A 145
310A 165
COLOR 600 419
COLOR 710 NEW 515
TAXAN 12" Green 114
12" Amber 117
420 RGB 439
PRINCETON HX-12 459
SR-12 649
MAX-12 168
ZENITH 122 – 12" G 93
12" A 93
124 MONO – IBM 169
135 RGB/COMP 475
POLO 16 COLOR RGB!! 350

MODEMS

HAYES 300 195
1200 459
1200B IBM INTERNAL 389
MICROMODEM II E 209
ANCHOR MARK XII 244

PRINTERS

*****DOT MATRIX*****
EPSON RX 80 100 cps 235
RX 80 F/T 100 cps 279
RX 100 100 cps, 132 col. 399
FX 80 or JX 80 ..... best price
FX 100 160 cps, 132 col. ..... in
LO 1500 200 cps NEW! ..... magazine
OKIDATA 82A/83/84 ..... Save
92P ..... All
93P ..... Models
2410 ..... Drastically Reduced!!
GEMINI 10-X 239
15-X 349
DELTA 10 or 15 ..... Special
RADIX 10 or 15 ..... $Call

*****DAISY WHEEL*****
PRIMAGE I 55 cps, SER/PARR 1395
w/Cut Sheet Feeder 1695
BROTHER DAISY WHEEL
HR-15 XL 359
HR-25 599
HR-35 (36 cps) 799
JUKI 6100 389
JUKI 6300 724
DIABLO 620 829
36 1276
630 1689
DYNAX DX-15 359
NEC all models ..... $Call
QUME all models ..... $Call

DRIVES

IBM 360 KB 219
TANDON 100-2 360KB 165
APPLE DRIVES Sale 135
TEAC ½ HI-360 KB 119
SHUGART ½ HI-360 KB 109
COGITO 10 MG H.D. W/CONTRL 665
ATARI INDUS GT 349

IBM SOFTWARE

*****SPREADSHEET*****
FRAMEWORK Monthly Special 355
FRIDAY 195
SUPERCALC 3 228
MULTIPLAN 136
IBM WORDPROCESSORS
WORDSTAR PRO PACK 249
PFS WRITE 84
MULTIMATE 249
WORD W/MOUSE 269
VOLKSWRITER DELUXE 159
PFS PROOF 84
IBM DATA BASE
dBASE II 284
dBASE III 355
PFS FILE 84
CONDOR III 249
R-BASE 4000 279
R-BASE CLOUT 129
IBM MISC
SIDEKICK 39
COPY II PC 29
THINKTANK 129
PROKEY 3.0 79
HARVARD PROJECT MGR 245
SIDEWAYS 45
NORTON UTILITIES 55
PFS REPORT 79
DOW JONES ANALYST 219
SET FX + ... 47
IBM GAMES
FLIGHT SIMULATOR 34
PINBALL 39
MATHBLASTER 45
FROGGER 28
ULTIMA III 35
ZAXXON 35
GATO SUB SIMULATOR 35

IBM – BOARDS

HERCULES GRAPHICS 305
HERCULES COLOR New! 165
AST SIX PAK W/64K 249
MEGAPLUS 259
STB GRAPHIX PLUS 309
EVEREX GRAPHIC EDGE 379
H.D. CONTROLLER 299
MAGIC CARD 199
OUADRAM OUADBOARD W/64K 269
OUADLINK 449
IBM MONOCHROME 249
COLOR GRAPHICS 219
PLANTRONICS COLOR PLUS 375
TECMAR GRAPHICS MASTER 475
PARADISE COLOR 279

IBM ACCESSORIES

64K RAM CHIPS 200ns 35
150ns 35
IBM KEYBOARDS 159
KEYTRONICS 5151 NEW! 179
5150 159
MICRO-SOFT MOUSE 129
MOUSE SYSTEM-MOUSE 124
KOALA PAD 85
JOYSTICKS – KRAFT/HAYES 45

APPLE – BOARDS

ORANGE MICRO GRAPPLER + ... 113
BUFFERED w 64K 168
MICROMAX GRAPHMAX 99
VIEWMAX 80 139
VIEWMAX 80E W/64K 189
MAC DISKETTES 48
IIc PRINTER INTERFACE 59
SUPER COOLING FAN 49

ACCESSORIES

PRINTER RIBBONS all makes ..... Low!!!
64K RAM chips SALE 35
VERBATIM SS/DD diskettes 21
DS/DD diskettes 27
DYSAN SS/DD diskettes 26
DS/DD diskettes 34
DISK MINDER-PLEXI (75) 19
DISK MINDER W/KEY (100) 24
SURGE PROTECTOR Compugard 59
PTI POWER BACK-UP 200 w 275
300 w 355
FINGERPRINTS – EPSON all models .. 48
PRINTER DUST COVER all models 10
MONI-BASE Monitor Stands 19
COMPUTER PAPER all makes ..... Low!!!
PRINTER STANDS Plexiglass 29/39
SURGE PROTECTORS ..... $Call

ATARI/C-64

ACCESSORIES low, low ..... CALL!!
C-64 CARDCO +G 79
ATARI MP1150 94
APE FACE 69
GRAPPLER CD COMMODORE 99

AST $229 SIX PAK PLUS w/64K RAM **$249**

10 MG ½ Hi Internal **HARD DISK** **$665** *****SPECIAL***** w controller card and cables!!! **$1099** 20 MG ½ Hi Internal

WORDSTAR 2000 · All new-easy to use · "Windows" · Footnotes · Spell Checker · Much, much more **$259**

mouse systems' w/PC PAINT **$124** **MOUSE** **$129** micro-soft

Color graphics card **$165** **HERCULES** **$309** Mono graphics card

DCC DISCOUNT COMPUTER CENTERS

an established mail order/retail distribution network

BUYER FRIENDLY TERMS! • **DELIVERY** We ship immediately! Most orders delivered within 5 days! Add 3% (15.00 min) for UPS shipping, handling, insurance. Calif residents add 6.5% sales tax. 2nd day UPS available at extra charge. • **PAYMENT** Visa, M/C, cashiers checks, money orders, personal checks accepted. (Allow 10 business days for personal company checks to clear). **WE NEVER CHARGE EXTRA FOR CREDIT CARDS!** C.O.D.'s welcome (20% p/p deposit) with cash, certified check or money order. • **WARRANTY** All items shipped are new, include **FACTORY WARRANTY** and are **GUARANTEED TO WORK. DCC** is an **AUTHORIZED DEALER** and **SERVICE CENTER** for most major brands • **RETURNS** Must be accompanied by **RMA** number (supplied by DEALER) and may be subject to a 20% restocking fee. Prices and availability subject to change without notice. All items limited to stock on hand. • **MAIL ORDER PRICES NOT VALID AT RETAIL OUTLETS DUE TO REGIONAL PRICING RESTRICTIONS.** Minimum order $50.00.

FREE – VISA/MC!

1707 S. BASCOM AVE • CAMPBELL, CA 95008 • (408) 559-6555
1243 W. EL CAMINO • SUNNYVALE, CA 94087 • (415) 965-4494
1341 FULTON AVE • SACRAMENTO, CA 95825 • (916) 971-3503

VISIT OUR DISCOUNT SHOWROOMS!

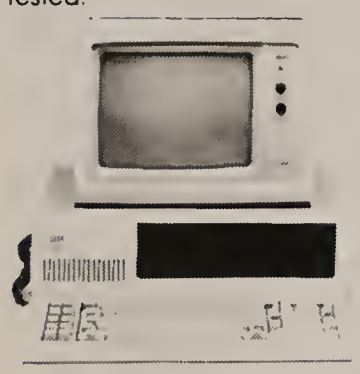
Circle 880 on reader service card

INTEK

We are setting standards in low pricing. Call our friendly staff for today's current stock prices on all items shown.

SYSTEMS

Following Systems are assembled & tested.



#01002
IBM PC With Keyboard, 64K (1) Floppy Disk and (1) 10 MB Hard Disk Up To 3x Faster Than The IBM PC XT. Compare At Over $4,000.00 Elsewhere.
INTEK SPECIAL
Low Price $2,195.00

#01001+ **IBM PC** W/KBD
64K, (2) 360 KB Diskette Drives
Monitor & Adaptor
Price ..... Call

#01002+
IBM PC System Unit With 256K, Keyboard, (1) 360 KB Diskette Drive And (1) 10 MB
Turbo Drive
Hard Disk $2,295.00

#01003+
IBM PC System Unit With 256 K, KBD, (1) 360 KB Diskette And (1) 20 MB
Turbo Drive
Hard Disk $2,595.00

#01010
IBM PC System Unit With 256K, KDB (1) 36KB Diskette Drive And (1) 33 MB
Turbo Drive
Hard Disk $2,995.00

DESKPRO Models I, II, III, IV Systems Available

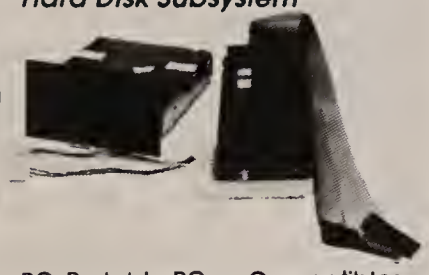
Compaq® + Portable PC
100% Software Compatible With IBM PC
Compaq + Turbo Drive™ = Compaq +™
With 256 K & (1) 360K Diskette Drive
Compare List at $3,995.00
Our Price $2,995.00

DISK AND TAPE SUBSYSTEMS

Internal ½ HT. 5¼" Low Power Winchester Hard Disk For Your IBM
™ Innovative Peripheral Tech. Inc

TURBO DRIVE™

Hard Disk Subsystem



PC, Portable PC, or Compatibles Including AT&T, ITT Xtra, Zenith, Compaq, Corona, Columbia, etc.

Includes:
Low Power ½ Height 5¼" Winchester Hard Disk Drive[1] Controller Board With On Board Eprom Containing Formatting & Utility Software To Allow Automatic Booting From Hard Disk. Mounting Hardware, Cables, & Easy Installation Instructions.

Turbo Drive™

Model	Capacity (Formatted)	Internal	External (For 1 or 2 1/2 Ht. Drives
TD8510[1]	10MB	549	749
TD8520[1]	20MB	SPECIAL	
TD8533[1,2]	33MB	1295	1349

[1]Specify Full or ½ Ht. Bezel
[2]Price Includes Optional 70W Power Supply That Attaches To Back of P.C. Replacement 135 W Drop In P.S. For The IBM PC Is Also Available.

Combination FDC and hard disk controller available.

External Winchester Expansion 10 to 120 MB ..... Call

IOMEGA
#06020
10 MB Removeable Cartridge ....
#60201
20 MB Removeable Cartridge ....

EVEREX HARD DISK/ BACK UP SYSTEMS
#06030
Full Size System With 8 Expansion Slots .....
#06031
Half Size System With 4 Expansion Slots .....
#06032
Slimline System With 3 +1 1/2 Size Expansion Slot .....
#06040
Tape Back Up ..... Call

Everex
45 MB ¼" Streaming Tape $1,045.00

INNOVATIVE I-8480 SERIES

8" Flexible Disk Subsystem

I-8480 Dual-Drive Subsystem $1,450.00
I-8481 Single Drive Subsystem $1,025.00
*I-84CP Character Code Conversion Program $70.00

HARD DISK DRIVES FOR PC AT

#06010
CMI 20 MB Add-In Full Height Hard Disk Drive including Mounting Hardware & Installation Instructions
Our Price $1,149.00
#06010-C
(Compatible) ..... Call
#06011
CMI 33 MB Add-In Full Height Hard Disk Drive Including Mounting Hardware & Installation Instructions
Our Price $1,495.00
#06011-C
(Compatible) ..... Call
#06050
20 MB Tulin ½ Ht. Hard Disk With AT Mtg. Hdwre. Our Price ... $635.00
#06051
40 MB Tulin ½ Ht. Hard Disk With AT Mtg. Hdwre. Our Price ... $949.00

TEAC 55GF
1.2 MB At Floppy $239
Controller $229

Microscience
10 MB ½ Ht. Hard Disk
Our Price $495.00

TEAC 55-B
320/360 KB ½ Ht. Floppy
Our Price $110.00

Mitsubishi
320/360 KB ½ Ht. Floppy
Our Price $105.00

PRINTERS

EPSON
#04010 RX80 .....
#04011 FR100 .....
#04015 LQ1500 .....
RX-80 F/T, FX80, JX80 ..... Call

TOSHIBA
#04021 P351 ..... $1295

TEXAS INSTRUMENTS
#04030 855 ..... $849

MULTI-FUNCTION & RAM EXPANSION

PERSYST
#07001
Time Spectrum OK, C, S, P .. $189
#07002
PC/Memory Plus Clock ..... Call
#07003
PC/Short Memory ..... Call

PARADISE
#07040 5-Pack $199

AST
#07010
Six-Pack Plus, 64K C, S, P, Megaplus II, MP Mini, I/O Mini, & Ast Advantage ..... Call

ORCHID
#07020 Blossom ..... Call

QUADRAM
#07030 Quadboard $259

TALL TREE SYSTEMS
#07040 J RAM 2 ..... Call
8087-3 ..... $149.00
64K Ram (set of 9 chips) 150 or 200 NS Our Price $18.00
128K RAM (set of 9 Piggyback) ..... Call
256K RAM (set of 9) . Call $55.00

MONITORS

IBM
#02010 Monochrome ..... Call

PRINCETON GRAPHICS
#02020 Max 12 Amber $189
#02021 HX 12 R&B $459
#02022 SR 12 HI RES RGB ... $595

TAXAN
#02030 122 Amber $139
#02031 420 ..... $419
#02032 425 ..... $449
#02033 440 ..... $595

AMDEK
300G, 300A, 310A ..... Call

QUADRAM
#02050 Amberchrome ..... Call

MONITOR ADAPTORS & GRAPHICS/COLOR CARDS

IBM
#03090
Monochrome Adaptor ..... Call

EVEREX
#03010
Graphics Edge $349

PERSYST
#03030 BoB Display $425
#03021
PC/Monochrome Card $199
#03022
PC/Color Graphics Board ... $199

PARADISE
#03030
Multidisplay $299
#03031
Modular Graphics $275

HERCULES
#03040
Color Card $195
#03041
Graphics Card $395

PRINCETON
#03050
Scan-Doubler ..... Call

SIGMA
#03060 Color 400 ..... $595

TSENG
#03070 Ultra Pak $499
#03071 Ultra Pak S $395

TECHMAR
#03080
Graphics Master $495

STB
#03090 Mono Plus $175
#03091 Mono 132 ..... $285
#03091 Graphix Plus II $349

COMMUNICATIONS AND NETWORK PRODUCTS

MODEMS:

HAYES
#08001 Hayes 1200B $399

BIZCOMP
#08010 1200B Compat $429

VEN-TEL
#08020 1200 ½ Card $395

CTS
#08030 Standalone External Hayes 1200 Compat $395

QUADRAM
#08040 Asher ..... Call

LAN 3 COM ..... Call

DEALER INQUIRIES WELCOME.

TERMS: Prepayment in full required on some products. Add 5% for COD Except for local customer will calls. Minimum of 25% required to initiate order through certified funds or credit card. (Personal or non-D&B rated company checks require 10 days to clear.) Payment in full required with shipment. Government agencies, institutions, colleges & universities, & D & B rates corporations' P.O.'s welcome. FREE shipping & handling on prepayment. Prices subject to change without notice. Combination and quantity discounts are applicable 20% re-stocking charge. Approval required on credits.

Dealers circle 228 on reader service card

WARRANTY: All products that we distribute or represent are brand new with full manufacturer's warranty.
SERVICE: All returns require an MRA (Material Return Authorization) number for in and out of warranty repair.

2917 Newport Blvd., Newport Beach, CA 92663 Catalog/Showroom Hours
8:30 to 5:30 M-F
9:00 to 12 Noon Saturday

(714) 675-2441

End users circle 172 on reader service card

don't leave the office without it.

Introducing TURN-ON™ —The Intelligent Power Controller.

Finally you can access your personal computer without leaving it on. Avoid unneeded wear and power damage by turning on your computer only when needed.

TURN-ON is ideally suited for unattended computer phone networking. With TURN-ON, a simple phone call powers up your computer system for remote data processing and automatically powers it down when complete. Using TURN-ON you can leave your computer on to complete batch processing and it can power itself down when done. Protect your computer with TURN-ON's built-in surge suppression and optional security software.

Call or write today for our free data sheet and the name of your dealer that carries TURN-ON.

SKYLAND SYSTEMS, INC.

150 Green Valley Road
Scotts Valley, CA 95066
(408) 438-5007

OEM and reseller inquiries invited.

World May

Circle 187 on reader service card

StatPac™

The World's Best
Micro Computer Based Statistical
Analysis Package

Forecast Plus™

Time Series Analysis Package
The Business Forecasting Tool
for the Non Statistician

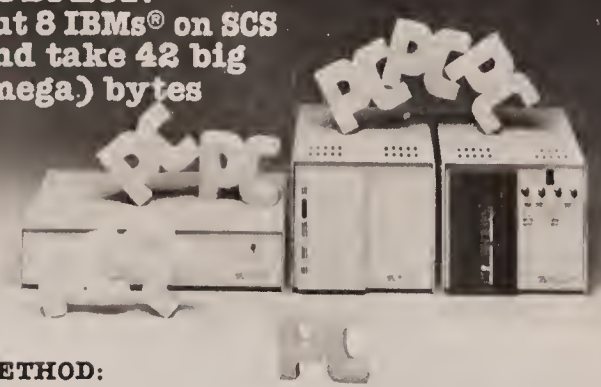
Call For Free Comprehensive Brochures

1-800-328-4907

WALONICK ASSOCIATES
6500 Nicollet Ave. S. Minneapolis, MN 55423
[612] 866-9022

Memo to IBM users

SUBJECT:
Put 8 IBMs® on SCS and take 42 big (mega) bytes



METHOD:
Using the SCS MULTIPLEXER illustrated.

RELEVANT DATA:

- SCS MicroCube Winchester Mass Storage System for IBM PC's and XT's holds 5, 10, 21, and 42 MB. Uses RODIME 5¼" Winchester Hard Disc Drives.
- SCS Micro-Multiplexer for IBM PC's and XT's Supports 8 IBM's — 16 with extender.
- SCS-TS-60 High Speed Tape Streamer Backup stores 42 MB on tape in 9 minutes.

CONCLUSION:
Order through IBM dealer or get more information by enclosing business card with this memo and send to:

Space Coast Systems, Inc.
301 S. Washington Ave., P.O. Drawer 2767W
Titusville, FL 32796
305-268-0872 • Telex 701506

Circle 922 on reader service card

Prevent Computer Theft!

Kāblit Systems

Unique Kāblit fasteners attach to equipment without drilling, using existing screws. Cable passes through fasteners preventing removal. Cable is then locked. When ordering multiples, specify locks keyed differently or alike. Installs in 10 min. Over 80 college installations.

Heavy duty 10' steel cable secures computer, other equipment, up to 6 units.

Kāblit works with: •Computers •Printers •Disk Drives •Typewriters •Stereos •Monitors •Lab Equip •Televisions •Other

$54.95 postage paid. Quantity pricing also avail. for schools, institutions, businesses, etc. Send P.O. Money back if returned in 30 days.

EXCLUSIVE!
Proprietary components prevent removal of mounting screws. (Pat. Pend.)

SECURE-IT Inc. 10 Center Square • E. Longmeadow, MA 01028
Phone orders 413-525-7039
Dealer Inquiries Invited

Circle 886 on reader service card

CONSTRUCTION CONTRACTORS

Get a New Handle on Your Business.

The Software Shop Construction System for the IBM Personal Computer AT.™

- Comprehensive construction accounting
- Fully integrated functions
- Easy to learn, easy to use
- Committed local dealer support
- 97.9% rate of user satisfaction

Call **800-554-9865** for the dealer nearest you

Software Shop — Authorized IBM Personal Computer Value Added Dealer

SYSTEMS — A CGA Computer Company

™ Trademark of International Business Machines Corporation

Circle 726 on reader service card

Dysan CORPORATION

THE FINEST QUALITY DISKETTES **AVAILABLE**

ORDER TOLL FREE!
1-800-523-1238
In California: (408) 252-4210
Mon-Fri, 8:00am-5:00pm Pacific Time

Select from our complete line of computer supplies — utilize reader service, write or call for our **FREE CATALOG**

GAAN

Computer Supplies

1741 Saratoga Avenue #100 San Jose, CA 95129
(408) 252-4210

Circle 125 on reader service card

DUST COVER PROTECTION WITH ANTI-STATIC, LINT FREE NYLON PACK CLOTH

IBM PC OR AT Keyboard	14.00
IBM PC OR AT Monitor	16.00
IBM PC OR AT Drive	16.00
IBM PC OR AT Mon/Dr Comb. 1 pc.	28.00
IBM PC JR.	2.00 less ea.
IBM Graphics, FX 80, Oki 82,92	16.00
Epson FX 100, Okidata 83,93	18.00

OTHER COVERS AVAILABLE
Silver Gray with Black Trim
CHECK/VISA/MC
Plus $2 Ship. & Hand. – R.I. Res. Add 6% Sales Tax

© 1984 ComputerAid
P.O. BOX 293, BARRINGTON, R.I. 02806
FOR QUANTITY DISCOUNTS (401) 245-0532

Lotus™ User?

Free Mail Order Catalog for Lotus Software users, includes:
- Lotus Programs
- Lotus Enhancement Software
- Books and Training Aids
- Hardware and Utilities

We are a unique mail order company specializing in Lotus related products.

4-5-6 WORLD
P.O. Box 22657
Dept. A-101
Santa Barbara, CA 93121
(800) 524-5678 Toll Free
(805) 564-2424 In California

4-5-6 WORLD™

Your definitive Lotus enhancement source

Circle 854 on reader service card

64K RAM $1.45*

256K RAM $6.95*

*150 NS Top Quality Parts, Quantity Price

- 10 MB Hard Disk Sub Sys $660
- Multifunction Card 64K $219
- Graphics Card Color & Mono $315

For Information Call
(714) 937-0899
For Order Only **800-233-6688**

GOLDEN SEA ELECTRONIC
635 N. Eckhoff, Suite H, Orange, CA 92668

Circle 161 on reader service card

SAVE MONEY

Public Domain
&
(User Supported)

PC SOFTWARE

#1 PC-Write (word processor)
#2 PC-File III (data base manager)
#3 PC Calc (spreadsheet)
#4 PC Dial (modem communications)
#5 Bus & Finance (46 business & financial programs)
#6 Games (flight, adventure, startrek, packman, & many more)

$8.00 Each

Try our Six-Pac
all the above double sided $34.95

(Please specify, double or single sided format)
(all orders add $2.00, shipping & handling)
The above programs were tested on the IBM PC, will run on some compatibles
Be certain of compatability before ordering!
Works on Jr too!

Soft/Plus Research
P.O. Box 590
Boonville, CA 95415
(707) 895-2210

MasterCard VISA

Circle 850 on reader service card

STRESS KILLS

Fight Back With Your P.C.

- Convert your P.C. into a biofeedback machine
- New software replaces expensive training & equipment
- Practice biofeedback in home or office
- Includes three programs, headband monitor and audio relaxation tape
- Order now for Special Free Offer

The Stress Manager

Box 776
Clayton, CA 94517
800-235-6647 (Calif.)
800-235-6646 (Nationwide)
ext. 635

Circle 8 on reader service card

OPT-TECH SORT™

SORT/MERGE program for IBM-PC, XT & AT

Now also sorts dBASE II files!

- Written in assembly language for **high performance** Example: 4,000 records of 128 bytes sorted to give key & pointer file in 30 seconds. **COMPARE!**
- Sort ascending or descending on up to nine fields
- Ten input files may be sorted or merged at one time
- Supports many file structures & data types
- Filesize limited only by your disk space
- Output file can be full records, keys or pointers
- Can be run from keyboard or as a batch command
- Can be called as a subroutine to many languages
- Easy to use — Fully documented
- **$99** — VISA, M/C, Check, Money Order, COD, or PO Quantity discounts and OEM licensing available

To order or to receive additional information write or call:
OPT-TECH DATA PROCESSING
P.O. Box 2167 Humble, Texas 77347
(713) 454-7428

Requires DOS, 64K and One Disk Drive

Circle 950 on reader service card

Learn Basic with BASIC TUTOR $29.95

- For IBM PC and compatibles
- Menu Driven — MBASIC or GW BASIC required.
- BASIC TUTOR gives a thorough introduction to programming with Microsoft Basic.
- 20 Lessons, on Disk, to help develop your programming skills.
- Test your knowledge during each lesson by taking the quizzes offered by BASIC TUTOR.
- Visa, M.C., Check — No C.O.D.'s.
- Add $2.50 shipping and handling.
- PA residents add 6% sales tax.

Logistics Software Inc.
P.O. Box 2423
Warminster, PA 18974
215-343-4537

Circle 965 on reader service card

CUT RIBBON COST

Re-ink most fabric ribbons with only one machine

INK MASTER
$159.00

- No Fuss No Mess
- Simple to Use
- Versatile
- Adjustable

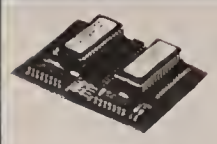
E-ZEE INKER
$39.50

BORG INDUSTRIES
525 Main Street
Janesville, Iowa 50647

ORDER TOLL-FREE:
800-553-2404
In Iowa: 319/987-2976
Visa/MC accepted

Circle 721 on reader service card

PC-WRITER T.M.



IBM PC GRAPHICS
&
LETTER QUALITY

Enhancement for Okidata ML82A/83A Dot Matrix Printers

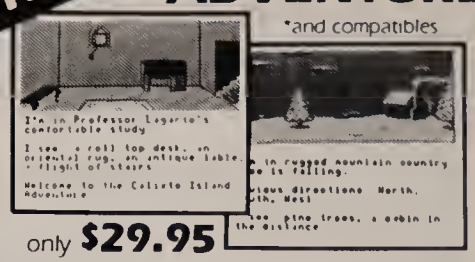
- Plug-in module easily installs in printer.
- Draft (120 cps) & Letter Quality (30 cps)
- Elite character pitch
- Front panel access to all features
- Full emulation of IBM PC graphics printer
- Superscripts / subscripts
- Foreign / scientific characters
- Works with print screen key in graphics and text
- Prints all 228 display screen characters and box drawing symbols exactly as they appear on display (double line as well as single line box symbols)
- Many other features

RAINBOW TECHNOLOGIES, INC.
17971-E Skypark Circle, Irvine, CA 92714
(714) 261-0228 Telex 386078

Circle 328 on reader service card

NEW!

Give Your IBM* an
ADVENTURE
*and compatibles



only **$29.95**
each plus $2.00 shipping/handling.
California residents add 6% sales tax.

OUR POPULAR HI-RES COLOR GRAPHIC ADVENTURES
Calixto Island • Black Sanctum
Shenanigans • Sea Search • Trekboer
are now available for the IBM
to challenge and entertain you.

SEND FOR OUR FREE CATALOG!
Drives, Monitors, Supplies, etc.

MD Mark Data Products
24001 Alicia Parkway, #207
Mission Viejo, CA 92691 • (714) 768-1551

Circle 989 on reader service card

Get a PC of the Action with a PC WORLD Action Ad!

Toll Free:
800-872-7800
(CA: 800-872-7808)

PC EXPANSIONS

Qume 142A	$189
Teac FD55B	$129
Tandon TM100-2	$169
Tandon TM101-4	$239
CDC 9409	$169
Maynard Disk Controller	$114
Sandstar Series	$call
Internal 10MB HD systems WS1	$849
WS2	$1020
MaynStream tape backup	$1229
Quadboard (64K)	$254
Quadboard (384K)	$379
Quadcolor I	$199
AST SixPakPlus (64K)	$259
SixPakPlus (384K)	$384
MegaPlus (64K)	$269
Advantage	$call
I/O Plus	$129
PCnet - starter kit	$809
HERCULES graphics board	$339
Color Card with PP	$169
HAYES Modems 300	$199
Smartmodem 1200	$469
Smartmodem 1200B	$399
Set of 9 chips (64K)	$25
256K chips (each)	$12
8087 chip	$139
Verbatim Datalife disks (20)	$49

VLM Computer Electronics
10 Park Place • Morristown, NJ 07960
(201) 267-3268 Visa MC Check or COD

IBM PC / VT100

EM100
for IBM PC, XT, AT
APRICOT and VICTOR 9000

VT102 emulation, English setup menu, 110-9600 BAUD, ASCII file transfer, Modem 7 binary transfer, 132 columns, soft keys, and more! *Optional Tektronix 4010 emulation.*

Multicopy discounts

Diversified Computer Systems, Inc.
100 Arapahoe, Boulder, CO 80302
(303) 447-9251

Dealer inquiries invited.

Trademarks VT100-Digital Equipment IBM PC, XT-IBM Corp VICTOR 9000-Victor Technologies COMPAQ-COMPAQ Computers Inc

Circle 199 on reader service card

IBM AT 3Mb COMBO CARD
WITH LIFETIME WARRANTY*

The AT Multifunction Card that can give you up to 3Mb of added memory plus added I/O features.

Expandable from 128K to 3Mb. Add memory as you need it. • IBM AT Compatible • Parallel Port • Serial Port • Spooler • Supports IBM VDISK • User Upgradable • Parity Checking Standard • Split Memory Addressing

Complete with 128K RAM, Serial and Parallel Port $449
AT RAM Expansion Card (0K) $249
Additional RAM available at our low prices. **OTHER ADD ONS** 384K RAM Clock, 512K RAM Card, Spoolers, RAM Cards for PPCs and more.

Apparat, Inc.
ADD ON AND ON AND ON AND ON AND ON
4401 So. Tamarac Parkway Denver, CO 80237 / 303/741-1778
ORDERING AND DEALER INFORMATION
800/525-7674
Stores in Denver & Chicago *On all cards sold after June 1, 1984

Circle 10 on reader service card

ICs PROMPT DELIVERY!!!
SAME DAY SHIPPING (USUALLY)

OUTSIDE OKLAHOMA: NO SALES TAX

INCREASE XT MOTHERBOARD TO 640 Kbyte CONSUME NO EXPANSION SLOTS! $181.80

DYNAMIC RAM			
256K	256Kx1	150 ns	$ 7.15
128K	128Kx1	150 ns	15.67
64K	64Kx1	150 ns	1.79
64K	64Kx1	200 ns	1.97
EPROM			
27256	32Kx8	250 ns	$26.97
27128	16Kx8	250 ns	9.97
27C64	8Kx8	200 ns	8.75
2764	8Kx8	250 ns	4.29
2732A	4Kx8	250 ns	4.87
2716	2Kx8	450 ns	3.21
STATIC RAM			
6264LP-15	8Kx8	150 ns	$10.70
6116LP-3	2Kx8	150 ns	3.43

QUANTITY ONE PRICES SHOWN

OPEN 6½ DAYS: WE CAN SHIP VIA FED-EX ON SAT.

MasterCard VISA or UPS CASH COD
Factory New, Prime Parts µPs
MICROPROCESSORS UNLIMITED
24 000 South Peoria Ave
BEGGS OK 74421 **(918) 267-4961**

Prices shown above are for March 11, 1985

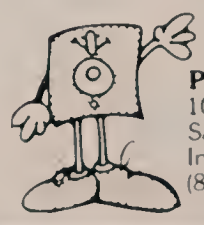
Please call for current prices. Prices subject to change. Please expect higher or lower prices on some parts due to supply & demand and our changing costs. Shipping & insurance extra. Cash discount prices shown. Small orders received by 6 PM CST can usually be delivered to you by the next morning via Federal Express Standard Air for $6.50!

Circle 103 on reader service card

Maxell Floppy Disks

The Mini-Disks
with maximum quality.

Dealer inquiries invited. C.O.D's accepted.
Call FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401
In Cal call (800) 592-5935 or
(805)543-1037

Circle 576 on reader service card

COMPUTER BRIDGE BREAKTHROUGH

BRIDGE PARLOR™ $75.00

Guaranteed to be the Best Computer Bridge Game Available

- Over a MILLION Random Deals
- Rubber MPS, IMPS Chicago Partials
- CLAIM CONCEDE HINTS TAKEBACK available
- Computer is your Partner and the Opposition
- Deals Bids Declares Defends, and Scores
- Accepts External Deals from any Source
- Many more advanced usage features
- Printed BID and PLAY history of any Game
- Unique 10 Game Tournaments for Owners Only
- Free Newsletter to Owners

RUNS ON ANY 192K IBMPC OR COMPATIBLE

Shown at the RYE NY Regional
See it at the NAC in Montreal & Las Vegas.

Owners will receive the best games from the NAC to play on their BRIDGE PARLOR™

To Order send Check, MO, VISA, or MC to

PARLOR SOFTWARE CO.
Box 2100, Liverpool NY 13089

add $4 S&H — NY addresses add 7% NY sales tax
OR CALL TOLL FREE
1-800-228-2028 ext. 40
ONLY

aha!

(408) 458-9119 does it all!

CALL! Sampler Pack of Project Management Software on its way in 24 hours!

The wisest phone call you'll ever make! Includes: PMS-II, RMS-II, MMS-II, HARVARD TOTAL PROJECT MANAGER, PERTMASTER, HORNET, TIMELINE, SORCIM SUPER PROJECT, MORE. PLUS! Staff of Project Managers & Microcomputer pros provide CUSTOMER SUPPORT! One call does it all!

Ahal, Inc. P.O. Box 8405
Santa Cruz, CA 95061-8405

Circle 41 on reader service card

NEW! Read/Write Cartridge for PC Jr.

Now you can store your important data on GSN Computers Utility Memory Smart Cartridge

- Contains unique built - in read/write memory
- Stores and encrypts upto 2K bytes on cartridge, or encrypt larger amounts on cartridge and store on disk
- Stores programs from BASIC, DOS, assembly language
- Exclusive patent - pending design
- Provides secure storage in harsh environment
- No BASIC cartridge needed
- No disk drive needed
- Simple built - in commands make it easy to use

Price $155.95 each
Inquire at your software dealer or contact:

GSN Computers Corporation
P.O. Box 710 Ossining New York 10562
914 / 941 - 1221

Circle 976 on reader service card

STATPLAN II

$99

Statistical Software for IBM PC Computers

- Easy to use. Menu driven. Full-screen data entry, editing. Transformations. Help screens.
- Cross plots, histograms, time series plots.
- Basic statistics, cross tabs, ANOVA.
- Multiple regression with residual analysis.
- Curve fitting, exponential smoothing, auto-correlation, seasonality.
- Interface with Lotus 1-2-3, VisiCalc, dBase II and ASCII files.

THE FUTURES GROUP
76 Eastern Boulevard
Glastonbury, CT 06033 (203) 633-3507

Circle 532 on reader service card

*IBM® PC/XT/AT Compatible

pc pipeline

*4164-120/150/200	129
*128K-150/200 for AT	995
*256K-150	599
*Teac half-height for AT	119.00
*20 Mb Hard disk for AT	695.00
8087-3	119.00
Apple Drives — half heights	124.00
*Tandon/CDC full height drives	109.00
*CDC/Teac half height drives	109.00
*Micro Science 20 Mb kit for PC/XT	839.00
*10 Mb Hard Disk System	649.00
*20-100 Mb Hard Disk Drives Lowest Prices/Call	
*Everex Magic Card 0-384 expansion	179.00
*Everex Magic Card w/384K RAM papulated	259.00
*Everex Graphic Edge Calar Cards	339.00
*Drive Installation Kits	Call

Add $3.95 shipping to all orders • Prices subject to change • PO's on approval • C.O.D. OK • All new, no surplus, no seconds
QUANTITY DISCOUNTS • Corporate accounts invited

3310 West Main St. Tampa, FL 33607
In FL and for info, call 813-875-0299
FOR ORDERS ONLY, 800-237-8910
TELEX 330690
FAX LINE: 813-876-7194

Circle 626 on reader service card

IBM PC=HP TERMINAL?

? ? ?

YES!

Now your PC can access your HP minicomputer.
For only $200.00

CALL NOW!
Visa and MasterCard welcome.

Inner Loop Software
5456 McConnell, Suite 120
Los Angeles, CA 90066
(213) 822-2800

Your company P.O. accepted.

Circle 624 on reader service card

PREBASE V2.3

A Symbolic Macro Preprocessor For Basic

Prebase simplifies the task of creating large programs by using easily remembered labels in place of cumbersome line numbers.

PREBASE FEATURES

- Labels are used in place of line numbers, such as GOSUB .PRINT FILE
- Create new functions with the extensive Macro capabilities, such as INSERT$ (A$,B$,4)
- Print multiple lines to the screen with one PRINT statement.
- Build libraries of macro functions and symbols, then use the INCLUDE statement to pull them into your programs.
- Easy debugging with the cross reference facility.
- Readability and documentation are greatly improved.

For Use On IBM PC, AT, XT, jr & On True Compatibles

ORDER BY PHONE
24 HOURS A DAY
513-426-0252
SEND CHECK OR MONEY ORDER TO:

RSG
RICKARD SOFTWARE GROUP
P.O. BOX 71
ALPHA, OHIO 45301

PREBASE PACKAGE, PLUS MANUAL, EXAMPLE PROGRAMS AND MACRO FILES.

$49.95
NON COPY PROTECTED

Circle 726 on reader service card

VT102/TEK 4010

TERMINAL EMULATION SALE!

For the IBM PC, XT, AT, PCjr and Compatibles

PC102 precisely emulates DEC VT102, 101, 100, and VT52 terminals

PC4010 includes all PC102 features plus Tektronix 4010 graphics

A few reasons why thousands of customers — including GE, Dow, Raytheon, Westinghouse, and Stanford University — prefer our products

- Complete keyboard and screen emulation w/line graphics (optional 132-columns)
- ANSI color, local printer, bidirectional file transfer support
- Guaranteed compatibility with all DEC applications including EDT, WORD-11, ALL-IN-ONE, DEC-CALC, UNIX vi
- New DOS shell key, ten programmable softkeys, plus full DOS 2.X-3.X path names
- Written in C and ASM, up to 38.4 KB

PC1D2-JR	~~$89.00~~	$69.00
PC1D2 for PC, XT, AT, QNX	~~$139.00~~	$89.00
PC4D1D	~~$179.00~~	$139.00

Prepaid C.O.D. Mastercard VISA

30-DAY money back guarantee!
CALL TODAY!

gms
6440 Flying Cloud Dr
Suite 205
Minneapolis, MN 55344

GENERAL MICRO SYSTEMS
(612) 944-0593

Circle 927 on reader service card

Scroll & Recall™

Screen and Keyboard Enhancement for the IBM-PC XT AT & Compatibles

Allows you to conveniently scroll back through data that has gone off the top of your display screen. Up to 27 pages of data can be recalled or written to a disk file.

Allows you to recall, edit and re-enter your previously entered DOS commands and data lines, without retyping.

Very easy to use, fully documented. Compatible with all versions of DOS, monochrome & graphic displays.

***$69** - Visa, M.C, Check, COD, POs*

Make Your Work Easier!

To Order or to Receive Additional Information, Write or Call:
Opt-Tech Data Processing
P.O. Box 2167 • Humble, Texas 77347
(713) 454-7428
Dealer Inquires Welcome

Circle 894 on reader service card

Now, the lowest prices ever on

3M Scotch® DISKETTES

LIFETIME WARRANTY!

$1.49 ea 5¼" SSDD Qty. 50 — **$1.99** ea 5¼" DSDD Qty. 50

5¼" SSDD-96TPI → $2.29 ea 5¼" DSDD-96TPI → $2.85 ea

SOFT SECTOR ONLY! MINIMUM ORDER: 20 DISKETTES

ADD 3% FOR ORDERS UNDER 50!

FREE! FLIP 'N FILE 15 w/10 DISKETTES. (Eff. Thru 5/30/85)

These are factory-fresh 3M diskettes packed in boxes of 10 with Tyvek sleeves, reinforced hubs, identification labels and write-protect tabs

3.5" MICRO-DISKETTES—SS-135 TPI → $2.89 ea

LIFETIME WARRANTY ON ALL 3M SCOTCH DISKETTES!

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD! Authorized Distributor Information Processing Products **3M**

FANTASTIC LOW PRICES ON

BASF QUALIMETRIC DISKETTES!

LIFETIME WARRANTY!

$1.29 ea. 5¼" SSDD Qty 20 — **$1.49** ea 5¼" DSDD Qty 20

5¼" SSDD-96TPI — **$1.46** ea 5¼" DSDD-96TPI — **$1.75** ea.

PACKED IN CARDBOARD CASES!

BASF QUALIMETRIC DISKETTES have a LIFETIME WARRANTY with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs.

SOFT SECTOR ONLY! MINIMUM ORDER: 20 DISKETTES

BASF 3.5" MICRO-FLOPPIES SSDD-135 TPI — **$2.50** ea.

BASF 5¼" HIGH DENSITY FOR IBM PC-AT DSDD-HD — **$4.91** ea.

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD! Authorized Reseller Information Processing Media **BASF**

Incredible value!

Nashua™ Diskettes

LIFETIME WARRANTY!

$1.05 ea. 5¼" SSDD Qty. 50 — **$1.15** ea. 5¼" DSDD Qty. 50

These are poly-bagged diskettes packaged with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs. NASHUA Corporation is a half-billion dollar corporation and a recognized leader in magnetic media.

SOFT SECTOR ONLY! Sold in multiples of 50 only!

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD! Authorized Distributor NASHUA MAGNETIC MEDIA

BETTER MODEMS AT LOWER PRICES!

...and get 24-hour shipping on your DISK WORLD! orders

1200/300 Baud Avatex Modem **$189.95** ea.

300 Baud Avatex Modem **$59.95** ea.

Avatex Modems have everything. They're inexpensive, Hayes-compatible, Auto Dial, Auto Answer and high quality (backed by a one-year warranty).

Best of all, our combination includes a One-Year FREE subscription to MCI MAIL and special communications software for placing TOLL-FREE orders with DISK WORLD!.

Orders received via MCI MAIL are shipped within 24-hours (subject to product availability).

(Cables are not included.)

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD! Authorized Distributor **AVATEX MODEMS**

DISK WORLD!

Ordering & Shipping Instructions

Shipping: 5¼" & 3.5" DISKETTES—Add $3.00 per each 100 or fewer diskettes. **Other Items:** Add shipping charges as shown in addition to other shipping charges. **Payment:** VISA and MASTERCARD accepted. **COD Orders:** Add additional $3.00 Special Handling charge. **APO, FPO, AK, HI & PR Orders:** Include shipping charges as shown **and** additional 5% of total order amount to cover PAL and insurance. **Taxes:** Illinois residents only, add 8% sales tax.

Prices subject to change without notice.
This ad supercedes all other ads.
Not responsible for typographical errors.
MINIMUM TOTAL ORDER: $35.00

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD!

ATHANA DISKETTES

The great unknown!

99¢ ea ← 5¼" SSDD Qty. 50 — **$1.09** ea. 5¼" DSDD → Qty. 50

You've used these diskettes hundreds of times...as copy-protected originals on some of the most popular software packages. They're packed in poly-bags of 25 with Tyvek sleeves, reinforced hubs, user identification labels and write-protect tabs.

LIFETIME WARRANTY!

SOFT SECTOR ONLY! Sold in multiples of 50 only.

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

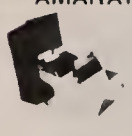
WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD! Authorized Distributor ATHANA MAGNETIC MEDIA

DISKETTE STORAGE CASES



AMARAY MEDIA-MATE 50: A REVOLUTION IN DISKETTE STORAGE

Every once in a while, someone takes the simple and makes it elegant! This unit holds 50 5¼" diskettes, has grooves for easy stacking, inside nipples to keep diskettes from slipping and several other features. We like it!

$10.95 ea + $2.00 Shpng

DISKETTE 70 STORAGE: STILL A GREAT BUY.

Dust-free storage for 70 5¼" diskettes. Six dividers included. An excellent value.

$11.95 + $3.00 Shpng

DISK CADDIES

The original flip-up holder for 10 5¼" diskettes. Beige or grey only

$1.65 ea + 20¢ Shpng

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD! The value leader in Computer supplies And accessories.

PRINTER RIBBONS:

at extraordinary prices!

Brand new ribbons, manufactured to Original Equipment Manufacturer's specifications, in housings (Not re-inked or spools only)

LIFETIME WARRANTY!

Epson MX-70/80 . . $3.58 ea. + 25¢ Shpng.
Epson MX-100 . . . . $4.95 ea. + 25¢ Shpng.
Okidata Micro83 . . $1.48 ea. + 25¢ Shpng.
Okidata Micro84 . . $3.66 ea. + 25¢ Shpng.

FOR ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-944-2788)

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time, Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD!

Nail down great prices on MEMOREX diskettes!

LIFETIME WARRANTY!

$1.28 ea 5¼" SSDD Qty 20 — **$1.70** ea 5¼" DSDD Qty 20

MEMOREX DISKETTES come with heavy, lintless paper sleeves, reinforced hubs, write-protect tabs and user ID labels

3.5" MICRO-FLOPPIES SSDD-135TPI $2.44 ea

SOFT SECTOR ONLY! MINIMUM ORDER 20 DISKETTES

5¼" DSDD HD FOR IBM PC AT $3.89 ea

INFORMATION & INQUIRIES: 1-312-944-2788

HOURS: 8AM-5PM Central Time Monday-Friday

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

DISK WORLD!, Inc.

Suite 4806 • 30 East Huron Street • Chicago, Illinois 60611

DISK WORLD!

Circle 780 on reader service card

PC World Directory

PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

FORMAT: *The standard format includes a product ID, a 300-character descriptive ad, and company name, address, and telephone number.*

Advertisers may choose among categories already in use, or they may create their own. Display advertisers can cross-reference their current ad to the PC World Directory *for increased exposure at low cost.*

RATES: *Listings are accepted for three-time consecutive insertions at a rate of $891 ($297 per issue). We offer a six-time insertion, 15 percent discount contract for a total of $1500 ($250 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.*

DEADLINE: *For copy deadlines, contact a* PC World Directory *sales representative at 415/861-3861 or 800/872-7808 (CA), 800/872-7800 (nat'l). Please send copy and prepayment to* PC World Directory, *555 De Haro St., San Francisco, CA 94107.*

Accessories

Computer Cases

PC Flight Cases
A complete line of rugged cases for PC equipment, w/full foam padding & key locks.
Flight Cases:
CPU & keybd. #18314 $169
Mon. & MX-80- #18315 $180
Mon. & FX-80 #19666 $209
ATA Shipping Cases:
CPU & keybd. #18342 $277
Mon. & MX-80 #18343 $281
Mon. & FX-80 #19541 $291
UPS shippable. AmEx/Visa/MC. Prices F.O.B. NYC. Free catalog. *Fiberbilt Cases, Inc., 601 West 26th St., New York, NY 10001-1199, 800/847-4176, 212/675-5820 (NY)*

Computer Covers

Computer Cozies?
Beautiful, hand-made, quilted dustcovers. A classy alternative to vinyl. Vinyl can damage machines by retaining heat. These covers are anti-static & machine washable. Offered in six colors: grey, chocolate, cream, wine, navy, & rust. Prices from $20. Send for free color brochure. *Covers A Lot, P.O. Box 369, La Honda, CA 94020, 415/747-0352*

PC Covers & More....
Protect your PC, AT, XT & PCjr investment with our durable, clear anti-static vinyl dust covers. 2 pc set (one covers monitor/system, one covers keyboard) only $15.95. $1 s/h. Visa/MC/chk. Printer covers, stands & other unique & useful accessories avail. Send for free catalog. Call/write to order. *SGW Enterprises, P.O. Box 29249, Dept. W, San Diego, CA 92129, 619/755-8324*

Supplies

Keytops/Key Overlays
Touchdown™ full size keytops enlarge major control keys on IBM & most compatibles. State model & color: black or IBM grey, $21.95. Touchdown™ key overlays available for 5251, 5520, DisplayWrite2, *WordStar*, *1-2-3*, & most popular software, plus do-it-yourself kits. $6.95-$29.95. U.S. orders postpaid. *Hooleon Company, Dept. WD, P.O. Box 201, Cornville, AZ 86325, 602/634-7517*

Compute Nonstop!
We've got the PC supplies & accessories to keep your system running smoothly. We can meet your continuous form paper, printwheel, ribbon & disk requirements. Major brands at competitive prices. Great values in accessories. Satisfaction guaranteed. Call or write today for free catalog. *Paxton Products, Inc., 1101 Paxton Rd. #5E, Cincinnati, OH 45208, 513/321-0400*

Keytabs & Printer Bases
Emulation keytabs display IBM 5251 nomenclature on the front or top of IBM PC keys. $7.95/set of 30. Printer bases at wholesale prices in 80, 96, & 132 column sizes. The 80 column base is constructed from smoked acrylic plastic with attractive curved front. 80 column $33.95, 96 col. $39.95, 132 col. $44.95. *Datacover Inc., 3657 HiDale, Lake Orion, MI 48035, 313/362-4013*

VDT Accessories

Compu-Specs
Soothing relief from eyestrain associated with VDT use. Ophthalmic quality frames & lenses. Lenses block ultraviolet, infra-red, reduce visible intensity. Unique color-high contrast, cosmetically pleasing. Guaranteed. Specify men's or women's, $21.95; clip on (to own glasses) $23.95. Check or money order. *Optical Technologies, J.A.F. Box 1186, New York, NY 10116*

Books

***dBASE II* in English I**
New Book Sensation. Simple—Logical—Easy to understand. Perhaps the finest computer book ever written. Will teach any novice to program in *dBASE II*. 242 pages full of great examples. Written by a father and son team who have decoded *dBASE*. Order your copy today. Dealer inquiry invited. Send $29.95 or MC/Visa to: *English 1 Computer Tutorials, 1617 N. Troy St., Dept. B, Chicago, IL 60647, 312/489-1588*

***WordStar* in English I**
Simple memory codes help you master *WordStar* and *MailMerge* in a few hours. A great reference with 184 pages full of practical examples. Saves time and money for anyone writing letters, charts, envelopes, mailing labels, or form letters. Block moves and IBM special keys fully explained. Order your copy today. Send $12.95 or MC/VISA to: *English 1 Computer Tutorials, 1617 N. Troy St., Dept. B, Chicago, IL 60647, 312/489-1588*

PC Books Wholesale
- Using *1-2-3* Que $11
- *WordStar* made easy $9

Top titles, authors, publishers. SUBJECTS: Framework, K-Man, *pfs*, *dBASE II/III*, *Symphony*, UNIX, C, etc. SYSTEMS: IBM, Apple/Mac, C64. PUBLISHERS: Sybex, Byte/Osborne, Sams, Dilithium, etc. Send $1 chk/MO (refundable) for catalog to: *PC Books, P.O. Box 10, Henrietta, NY 14467, 716/424-3680*

Business Opportunities

Medical/Dental Franchises
Software development company looking to establish new dealers. Franchises will include exclusive territory, source code, system documentation, advertising material & testimonials from end users. Over 200 end users nationwide. End user cost: $4500-$5000. Franchise cost $10,000-$25,000 plus a $100 royality per system. *MTA Medical Systems, 4825 Heffield Circle, Syracuse, NY 13215, 315/488-1518*

Software Developers
We are interested in receiving your completed packaged & business plan. Hammer Computer Systems, Inc. is in the software publishing business. Please send inquiries & complete portfolio to: *Thomas A. Horvath, Vice President of Sales and Marketing, Hammer Computer Systems, Inc., 700 Larkspur Landing Circle #285, Larkspur, CA 94939, 415/461-7633*

Become A Software Dealer
Become a key distributor for a new computer software marketing business. Run your own software business. Unrestricted income potential. Job independence. Low overhead. Good profit margins. Low investment. Write today for information. *RVG., Inc., 2001 Killebrew Dr., Minneapolis, MN 55420*

Computer Camps

Duke Computer Kamp
Give your child a truly worthwhile summer experience: a mixture of fun & learning that is an investment in the future. Duke University Computer Kamp has provided a unique experience for over 1800 campers since 1981. Dates: June 9th-August 9th, 1985. Ages 8-Adult. *Duke University Computer Kamp, Computer Science Dept., Durham, NC 27706, 919/684-5645*

Computer Repair

IBM Circuit Board
Repairs for PC, XT & PPC. An alternate source of professional circuit board & subassembly repair available through PC dealers & maintainers. Lower prices & faster turn-around, utilizing Automatic Test Equipment(ATE), typically 5 days in house. From keyboards to power supplies. Have your dealer or maintainer contact: *Unitrace Incorporated, 3350 Scott Blvd. #20, Santa Clara, CA 95054-3106, 408/727-7573*

IBM/COMPAQ
For years Computer Systems Repair (CSR) has specialized in IBM PC, XT & COMPAQ (Corp.) computer repairs. Our "State of the Art" automated test equipment makes CSR the leading third party repair source in the industry. Best of all, CSR offers quality repairs, 3-day turn around time & a 9 month warranty at a low cost. *Computer Systems Repair (CSR), Meadowlands Corporate Center, 205 Chubb Ave., Lyndhurst, NJ 07071, 201/460-1160*

Consultants

California

CompuSult
Now you can be assured that a qualified computer technician is available to speak with you about your computing questions. CompuSult is a computer consultant's agency. We can provide you with a specialized computer consultant who will zero in on your computing requirements & describe them to you in plain English. *CompuSult, 808 N. Kenter Ave., Los Angeles, CA 90049, 213/472-2568, 415/929-8780 (No. CA)*

dBASE Consultants
We're the experts!
- We write custom software
- Specialists in order entry, accounting, mailing list mgmt.
- Write for a catalog of *dBASE* utilities

Call or Write: *David Jenkins, Midway Software Inc., 1609 Bancroft Way, Berkeley, CA 94703, 415/644-2369*

Contracts

For Entrepreneurs
Legal contracts for hardware/software developers. Employee agreement, non-disclosure form, contracts for sale (hardware and/or software), consulting, development, hardware & software maintenance, non-competition, project delivery & more. Complete, documented, modifiable. Complete package $50. *Waters Publishing, 2636 Walnut Hill Lane #325, Dallas, TX 75229, 214/351-3442*

dBASE II Manual

dFASTER.dBETTER™
dFASTER.dBETTER is a performance manual for the serious *dBASE II* user. Gains of 20-60% + are very common. First use the insights, techniques & benchmarks. Then use dPROCESSOR™ to up speed even more. Everything you need to make dBASE really fly. $35 + $3 s/h (USA). Chk/MO/MC/Visa or request information. *Micro db Systems, P.O. Box 2380-R, Midland, MI 48641-2380*

Diagnostics

Keep Your Computer New
CROSS-CHEX™ is the complete menu-driven system of hardware diagnostics. It diagnoses the performance of Winchester & floppy disk drives, video display, RAM memory, video memory, ROM character generator & keyboard. Includes manual, diagnostic & program disks. $99. No risk 10 day $ back guarantee. Major credit cards ok. *Award Software, Inc., 236 N. Santa Cruz Ave., Los Gatos, CA 95030, 408/395-2773*

Directories

Asia & Canada
This computer & electronic directory of Asia gives the most reliable & detailed information on over 60,000 computer & electronic suppliers from Taiwan, Hong Kong, Japan, Korea, etc. Featuring exclusive product lines & credit information on each supplier. $95 (U.S.). Canada's directory of microcomputer & electronic retailers of Canada, $29.95. Distributors wanted. *Universal Computer Systems, P.O. Box 950, Champlain, NY 12919, 514/255-5501*

Disk Copy Service

Superior Disk Copying
Allenbach created the industry, & we've since been imitated–but never duplicated. What sets us apart from the crowd is the feeling you'll get that Allenbach is working exclusively for you. Whether you need 100,000 copies or just 100, we're here to serve you. Give us a call today & experience the confidence in dealing with the leader. *Allenbach Industries, Inc., 5957 Landau Court, Carlsbad, CA 92008, 800/854-1515, in CA call 800/468-2627*

3½" • 5¼" • 8"
SOFTWARE DUPLICATION on Premium Diskettes. Full service duplication house, including copy protection, private labeling & custom packaging. YOUR NEEDS ARE UNIQUE. Our service is responsive, expert & cost effective. A decade of servicing small & major customers. *Computer Media Products, 5482 Complex St., San Diego, CA 92123, 619/565-7802*

Western Transdata, Inc.
Why risk duplicating your important programs on your computer, when *our* equipment is designed solely to duplicate disks & verify their perfection 100%? Over 600 formats including Commodore 64. Plus serialization, copy protection, labeling, packaging, shrink-wrapping and *fast*, personalized service. *Western Transdata, Inc., 1701 E. Edinger Ave. A-7, Santa Ana, CA 92705, 714/547-3383 (collect)*

9 Track Tape to Disks
Conversion from ASCII or EBCDIC 1600 BPI magnetic tape to PC-DOS 5¼" diskettes. New high speed automated process verifies transfer. Quality guaranteed. Only SIX

CENTS per thousand characters. $95 minimum. Other conversions also available. *ASI Co., 1259 El Camino #260, Menlo Park, CA 94025, 415/323-6338*

Perfection Is Tough
Perfectly duplicated disks begin with perfectly made disks. That's why we use our SPECTRUM® disks for your copies. We're fast, priced competitively & understand your demand for customized packaging, labeling & serialization. We sample test your finished lot. All 5¼" & 8" formats, the result is the same. Perfection in. Perfection out. All the time. *Memory Media Products, 17032 Murphy Ave., Irvine, CA 92714, 800/228-0438 (nat), 800/228-9699, 714/863-1101 (CA)*

Duplication Solutions
The answer to software duplication needs, no matter what the vol. Choose control of duplication—your facility, ours, or both. We supply autoloaders, desk-top copy equip., disks & technical support. We provide duplication; technical assistance w/copy protection, serialization & proprietary formats; pkg. assembly, shrink wrapping & distributive shipping. *MegaSoft, Inc., P.O. Box 1143, Freehold, NJ 07728, 800/222-0490, 201/462-7628 (NJ)*

Disks

Bulk Disks DS/DD $1.05
SS/DD 95 cents. In quantities of 50. All disks are 5¼". Disks include LIFETIME WARRANTY & come with Tyvec sleeves, reinforced hubs & write-protect tabs. Shipping $3 per each 100 or fewer disks. NY state res. add sales tax. Chk/MO. Visa/Mc add 3%, AmEx 4% surcharge. Call for boxed disks & hardware prices. *Computer Brokerage International, P.O. Box 2100, Dept. PW-AO3, New York, NY 10185, 718/263-9500*

Hardware

Add-on Boards

256K Expandable Mem
64K-256K User Expandable (Socketed) Parity Memory, Precision Delay, Line Timing, Switch Selectable Start Address on 64K Boundaries anywhere in 1M Address Space, Hold-Down Bracket & Card Guide. 1 year warranty. Fully tested memory board, $98. RAM 64K increments, $39 ea. (9 64K chips, 200ns). Call for latest prices. *Ontrax, Inc., P.O. Box 368, Oakhurst, NJ 07755, 201/244-2302*

IEEE-488 Interface
Complete implementation of the IEEE-488 std. On-board firmware supports all data/command transfers & many special features. Our customers include HP, TEK, IBM, & major OEMs worldwide. Uses standard cables. Comprehensive documentation. See *Byte* 2/84, p. 334. $395. *Capital Equipment Corp., 10 Evergreen Ave., Burlington, MA 01803, 617/273-1818*

μP/Pal/Prom Programmer
PC compatible PROM-2000 card can program 2716, 32, 32A, 64, 128, MCM 68764 EPROMs & also 8748/49/51 processors. The software (CP/M-86, MS-DOS) can read, verify & program EPROMs & uses FAST programming algorithm. The zero-insertion socket is mounted on an external box. The external box for BI-POLAR proms & PAL is also avail. *Advanced Microcomputer Systems, Inc., 6802 NW 20th Ave., Fort Lauderdale, FL 33309, 305/975-9515*

No Slot Memory Upgrade
Let us install up to 256K RAM on your EXISTING PC1 SYSTEM BOARD using NO SLOTS. We improve your IBM PC so it can address the 64K RAM chips. 256K, $350 (expandable & warranteed). DO-IT-YOURSELF KITS, PC-KPC, $75.95. With assembled no slot PC Board, $99.95. 64K–RAMS ($5.50 ea). *Add-MEM, 22151 Redwood Rd., Castro Valley, CA 94546, 415/886-5443*

Disk Drives

1.2M PC-AT Disk Drives
Replace your PC disk controller & full-height disk drive with our JDISKETTE controller plus our 1.2M & 360K half-height drives for $549. Only $425 without 360K drive, $599 with two 1.2M drives. Put 800K on ordinary diskettes. 1.2M diskettes are $59 per box (10). Mounting brackets & JFORMAT included. Jdiskette also plugs into our JRAM-2 multifunction board. *Tall Tree Systems, 1032 Elwell Court #124, Palo Alto, CA 94303, 415/964-1980*

Printer Enhancements

PC-WRITER™
Easy to install plug-in module for Okidata ML82A/83A printers. Superior 30 cps LETTER QUALITY print, front panel access to all features, *full* IBM PC compatibility, dot addressable graphics, HEX dump, HELP mode, plus many more! Obsoletes "Plug 'N Play". See your dealer NOW! PC-WRITER makes your ML82A/83A printer TOP QUALITY! *Rainbow Technologies, Inc., P.O. Box 7200, Costa Mesa, CA 92628, 714/241-0565, Telex 386078*

Printers

NEC Spinwriter Catalog
Features the new 8850 *Spinwriter* for the IBM AT & *Pinwriter* for the PC & XT. A new color *Pinwriter* with interchangeable serial/parallel interfaces for your PC. The Elf $495 *Spinwriter* for the PCjr. The *Britewriter* 4 color pen/plotter HP7475 compatible uses ball point & felt tips in 9 colors. Call or write. *WPPS Inc., One Industrial Way, Ste. G, Eatontown, NJ 07724, 201/389-1600*

Storage Device

Disk & Tape Drives
IBM compatible storage & backup
15M disk drive $1099
* * other sizes available * *
9 track ½" tape drive
4 & 8 track ¼" tape drives
Try our Stanley Streamer Tape Drive complete subsystem for only $1250. *DSM & Associates, 31332 Via Colinas #112, Westlake Village, CA 91362, 818/991-9901*

Insurance

Safeware
If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media & purchased software. As little as $35 a year covers fire, theft, power surges, earthquake, water damage, auto accident. Call 8 to 8 Mon. thru Sat. *Safeware, The Insurance Agency Inc., 2929 North High St., Columbus, OH 43202, 800/848-3469 (Nat), 614/262-0559 (OH)*

Leasing

PC•XT•COMPAQ Rental
Quick delivery within US. All configurations including new AT, modems & printers. Attractive rates & flexible terms. Lease 1 month & longer. Custom leases to fit budget requirements. A portion of your lease payment can apply to purchase. Trade old PCs on new AT. Purchase/lease back available. *Use 'r Computers, Inc., 12800 Industrial Park Blvd., Minneapolis, MN 55441, 612/559-7096*

Mailing Lists

IBM Mailing Lists
Now over 687,000 micro owners: 194M Apple, 129M IBM PC, 152M TRS-80, 80M Commodore & more! 9 phone verified reseller lists including 5,183 stores, VARs, chains & more! 12,500 computer companies. Over 75 different micro & mini lists. Call/write for FREE catalog. Include phone & type of company. *Irv Brechner, Targeted Marketing Inc., Box 5125, Ridgewood, NJ 07451, 201/445-7196*

Publications

The Quarterly Report
A word processing consultant at your door! A newsletter of high standard published for all persons interested in using their w.p. software, equipment, tools to their fullest potential. Keeps you abreast of important current issues. Your knowledge, efficiency, & enjoyment of word processing will increase—we promise! Intro. rate $30/yr. *The Quarterly Report, Janet R. Wilson, Editor, P.O. Box 1060, Mercer Island, WA 98040*

Retailers

Ohio

Discount Software
We'll do all we can to help you use & enjoy your computer. We offer software, hardware and feature:
- Service
- Attractive Prices
- Toll Free Ordering
- Prompt Shipping
- Free Catalog

Ascus Micro (formerly Access Micro), 680 Northland Blvd., Forest Park, OH 45240, 800/543-1114. OH, AK, HI, 513/825-5803. Call or come in!

Sales/Marketing

NOW SELL Direct!
NEW DISKETTE HELPS EVERYONE SELL SOFTWARE OR SERVICE DIRECT TO OVER 1500 COMPUTER STORES NATIONWIDE. Cheaply test & sell your product. Includes store name, address, phone & type (IBM, Apple, etc.). FREE LABEL SOFTWARE INCL. *Mail-Merge/dBASE* usable. $50 postpaid. MC/VISA/Chk/MO. ACT TODAY. *Competitive Press, Inc., 2206 Pickwick Place, Dept. PW-2, Fullerton, CA 92633, 714/525-3684*

Sales Forecast
SALES MANAGERS, SALESMEN: You know you've got to do that forecast, but you dread it anyway, since it takes you away from what you do best: Selling. CompuCast can help. It is a *1-2-3* template that automates forecasting graphically & lets you use your own common sense. Std. $90. Enhanced: $140. *CompuCast Software, 5328 Fulton St., San Francisco, CA 94121, 415/386-6153*

Slides

35MM Slides
USE YOUR COMPUTER to make slides. Send graphics data via phone or send diskette by mail. On-line computer will answer the phone 24 hrs/day to provide information or to receive graphics data. Call or write: *Visual Engineering, 1600 West Frank, Lufkin, TX 75901, phone: 409/632-5696, computer: 409/637-3439*

Software

Accounting

Accountants Software
Finally! A software source for the practicing accountant with programs designed especially for the professional practitioner. Depreciation, After-The-Fact Payroll, Form #1099 Generator, Account Analysis & Client Information System are just a few of many. Call or send for our complete catalog. *Omni Software Systems, Inc., 146 N. Broad St., Griffith, IN 46319, 219/924-3522*

Bookkeeping Made Easy
Fast, single entry checkbook accounting system in "C". Audit trail is built into normal use. Special built-in safe guards to prevent errors. Allows 999 account codes w/budgets, 729 departments, 729 charge cards, bank reconciliations. Options to print checks, flexible, sorting & reporting. Demo $10, complete program $95. MC/Visa. MICRO-ONE-WRITE™. *Permar & Associates, 1125 Sunnyhills Rd. Dept. W, Oakland, CA 94610, 800/443-0100, ext 644*

CPA Review
IBM PC takes the work out of preparing for the exam. AICPA questions with referenced solutions are random generated by exam weights. Study single, multiple or all categories with or without solutions. Scores, creates results table & updates data base for future study. Sold by section. *Micro Mash, P.O. Box 6512, Huntsville, TX 77340, 800/241-9700*

Practicing Accountants
Ten of the top 12 CPA firms use AMI Software for Professionals. *DATAWRITE*™ Client Write-up allows custom reports, packs mainframe power into your micro. Expand your practice with *Fixed Asset Management, Post Facto Payroll, Practice Management & The TAX MACHINE*™. Nationwide training/support. *Accountants Microsystems, Inc., 3633 136th Place SE, Bellevue, WA 98006, 800/426-8201, 206/643-2050*

Joe Lynn's Payroll
Complete menu-driven user-friendly payroll. Calculates FWT, SWT, FICA, 4 misc. deductions. Prints paychecks, W2s, 941. Hourly & salary, manual or automatic. IBM PC & most compatibles. $49.95 + $3 shipping. Visa/MC/chk. 30 day money back guarantee. *Joe Lynn Computer Services, 23501 W. Gagne Lane, Plainfield, IL 60544, 815/436-4477*

INSTAR
"INTELLIGENT" INVOICING, STATEMENTS & ACCOUNTS RECEIVABLE Management System—Menu-driven Open Item Aged Monthly Statements, Invoice & Receipt Journals, Sales Reports, Packing Lists, Aged Trial Balance, Customer Status, Dun Notices, & more. Requires 256K. $169. MC/Visa/COD/chk. *dATAMAR Systems, 5055-A N. Harbor Dr., San Diego, CA 92106, 619/223-3344*

Custom Payroll
All systems support multiple pay categories, calculation of all taxes, user-defined deductions, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC BASIC with full source included for easy maintenance. Prices start at $695 for basic system and manual. *DATASMITH, Inc., Box 8036, Shawnee Mission, KS 66208, 913/381-9118*

Agricultural

Feed Blending Programs
MIXIT-2 ($595) finds least-cost rations for all animals. Hundreds of ingredients & 57 user-chosen nutrients. MIXIT-3 ($995) runs multiple rations. Each ration is stored on disk and summarized in a one-page output. PRICE-IT ($395) is a feed pricing and inventory program. Demo disks available. *Agricultural Software Consultants, P.O. Box 32, Dept. PF, Kingsville, TX 78363, 512/595-1937. Telex 757375*

Assemblers

Cross-Assemblers
Use your desktop computer as a development system with Avocet assemblers—the industry standard since 1980. Available for CP/M-80, CP/M-86, & PC-DOS/MS-DOS host systems, in most popular disk formats. Target chip families: 6805, 6809, 1802/05, 8048, 8051, 6502, 6800, NEC7500, F8, Z8, COP400, 8085, Z80. $200 to $500. *Avocet Systems, Inc., 804-W South State St., Dover, DE 19901, 800/448-8500, 302/734-0151*

Cross Assemblers
Operating on IBM PC & PC compatibles under MS-DOS, CP/M, relocatable assemblers are:
- Intel compatible for 8080,86,186,286,80
- Motorola compatible for 68010, 6809, 6800
- Manufacturer compatible for Z80, 6502 & others
- Relocatable meta assemblers

Full product line includes linkers, librarians. $600-$1800. *Microtec Research, Inc., 3930 Freedom Cir., Santa Clara, CA 95054, 408/733-2919*

Backup Restore

Backup Restore
Backup data base or other files from a Winchester to a floppy under Concurrent CP/M and/or CP/M-86.
- Automatic volume mgt.
- Selective file backup/restore
- Data base backup/restore
- Compression saves disk space
- Does a disk per minute

Requires IBM PC/XT or clone w/128K RAM, 1 dd & Winchester disk. 10 Day $ back guarantee. To order use any major credit card, or send $99 to: *Award Software, Inc., 236 North Santa Cruz Ave., Los Gatos, CA 95030, 408/395-2773*

Fast XT Backup
DATACARE™ lets your XT fly! Backs up a full 10M hard disk to diskettes in 22 minutes—any type/number of files. Better verification. No more data loss. Optimum use of your time & equipment. Nothing to learn: works just like your DOS Backup. 30-day unconditional guarantee. $129. Visa/MC. *Ellicott Software, Inc., 3777 Plum Hill Court, Ellicott City, MD 21043, 301/465-2690*

Business Applications

Myte Myke™ Business Pkg
Commercial Grade—Integrated
- BUSINESS ACCT: o/e, p/o, a/r, s/a, inventory, a/p, g/l
- MFG CTRL: std cost bom, oper rtg, where used, fcst-sched, mrp, mpp, prod order proc, sfc
- PROTIME: time & analysis, installation + ongoing support avail. CP/M, PC-DOS, MS-DOS, UNIX, others.

M & D Systems, Inc., P.O. Box 108 Orchard Park, NY 14127, 716/662-6621

Linear Programming
MINI-MAX ($395) is saving a copper refiner in Ashland, IL, $10,000 a month. "It's extremely easy to use," says an investment counselor in Oakland, CA. See how linear programming can boost your profits. The demo disk ($30) includes a Beginner's Guide and 70-page manual with 7 examples from business & industry. *Agricultural Software Consultants, P. O. Box 32, Dept. PL, Kingsville, TX 78363, 512/595-1937. Telex 757375*

MILP88-Mixed Integer LP
A general-purpose system for solving mixed integer linear programs w/up to 45 integers, 255 constraints & 1255 variables. Solves problems by applying an advanced version of the branch & bound method. Menu-driven w/many useful features similar to *LP88*. Requires 192K. $99 w/8087 support, user's guide. Visa/MC. *Eastern Software Products, P.O. Box 15328, Alexandria, VA 22309, 703/549-5469*

LP88-Linear Programming
A powerful menu-driven system for solving linear programs w/ up to 255 constraints & 2255 variables. Features include interactive & batch operation, spreadsheet-style input & editing, storage of problems & bases, Simplex Algorithm restart, report generator, sensitivity analysis. Req. 192K. $99 w/8087 support, user's guide. Visa/MC. *Eastern Software Products, P.O. Box 15328, Alexandria, VA 22309, 703/549-5469*

THORDATE
Everyone's personal appointment secretary. Create files with any editor. No fixed formats! Automatic reminder service, including standing appointments, or retrieve by date or week. Multiple users ok. Plus full calendar utility: sequential day-in-year, day-of-week, more. (PC, MS-DOS 2.x) $49 + 4% NC. *Thormark Systems, 1507 E. Franklin St. #125, Chapel Hill, NC 27514*

Business/Home

Users Group Shareware
Our Users Group Library features a wide selection of Shareware for your PC/PCjr. Order programs: $9.95 each, then register w/authors if you find them useful. • SAMPLER DISK—One get-acquainted disk, $9.95.
- SHAREWARE SIX-PAC—Includes *PC-File III* v2, *PC-Write*, *PC-Calc*, *PC-Dial*, *PC-Code* & *Personal Finance Mgr.*, $49.95. Catalog incl. Catalog alone $4. Add $2 s/h. CA res. add 6.5%. *Central California Users Group, P.O. Box 8140, Santa Cruz, CA 95061*

Tools for the Home
- BUDGET FORECAST $69.95
  Save time & $, plan spending. Track bills on monthly worksheets. Forecast 4 years or more. Calculate "what if" alternatives & see tax impact. 128K MS-DOS.
- PLOT PACKAGE $39.95
  Plot color graphs in line, bar or pie form with printer copy. Washington residents please add 7.8%.

BGW Systems, 16714 S. Meridian #200, Puyallup, WA 98373, 206/845-7845

MY-T-MAILER™ $30
Our users love this sturdy menu-driven worker. Secretaries say "Terrific!" Print labels, 3x5 cards, envelopes, any format. Customize labels with line-by-line printer fonts. Sort, Search & Select with powerful, flexible, easy user-interface. Print up to 5000 copies of one label. PCjr too! Requires 128K. $30. *Johnson Software Company, P.O. Box 16507, Dept. 6, Seattle, WA 98116, 206/935-4861*

Ledger Domain©
Super! Feature-packed, Menu-driven Checkbook System for *1-2-3*. Prints checks, one-key entry of recurring bills, auto statement reconciling. Access to data functions through menus: extract by dates, check numbers, categories, etc.; print any result. Tutorial & Utilities. Simple, intuitive, flexible. Req. *1-2-3* ver. 1a, 256K. $45 ppd. MC/Visa. *Richard Rapfogel, Ph.D., 6219 Washington Ave., St. Louis, MO 63130, 800/222-4747, ext. 3001, 314/768-0448*

Calendar

Time-Keeper (Calendar)
A calendar/scheduler featuring a weekly or monthly graphic display: multiple calendars, conference locating, copy or move appts. with or between calendars, search, tickler reminder, print selected appts., on-line help, user configuration files, + much more. 192K PC-DOS 2.0. Mono/color—any printer. $195. Demo avail. *DuraSoft, 7210 Washington Ave., New Orleans, LA 70125, 504/486-6081*

Church Applications

Parish Data System™
Comprehensive church program, menu-driven, extremely easy to operate. Family, Member, Financial info & all reports integrated into one package. Ability to get selective listings, mailing labels; contribution, tuition statements; personalized letters. User able to create own reports & letters. $950. *Parish Data Systems, Inc., 3140 N. 51st Ave., Phoenix, AZ 85031, 602/247-3341*

Collectors

"THE COLLECTOR"™
Our 4th yr. Now Avail. for PCs. Organize your collectibles (Dolls, Antiques, HHG's, Hummels, Trains, you name it) all on one disk. Disk holds 2000 items. Unlimited capability by copying master (it's allowed). Sorts Alph/Numeric with Cost/Cur Val at touch of a key. For PC/XT (128K-DOS 2.00/2.10). Free brochure, or $65. *The Third Rail, P.O. Box 143, O'Fallon, IL 62269, 618/632-7424*

Compilers

Professional Pascal
Serious software developers:
- Full ANSI Standard with extensions
- Cross compiler generates optimized MS-DOS code for 8088, 80186, 80286
- 8087 native code or emulation
- Separate compilation & communication with other languages
- Five memory models
- Produces ROMable code

$895. *Microtec Research, Inc., 3930 Freedom Cir., Santa Clara, CA 95054, 409/733-2919*

Construction

Construction System
Offers fully integrated Job Cost, GL, AP, PY & AR accounting for the XT & AT. Getting Started book, audio-cassette, HELP, online slideshow, & sample company tutorials for the first-time user. Complete manuals to help set up your books on each application. Options: network & Lotus interface. *Software Shop Systems, P.O. Box 728, Farmingdale, NJ 07727, 800/554-9865*

Culinary Arts

Diskette Cookbook Series
ATTENTION GOURMET COOKS! VANILLA is redefining the meaning of software publishing. Twenty-five outstanding cookbooks, each contained on a separate disk. Search, scale & print recipes from the thousands available in the Series' cookbooks. Powerful, yet simple; no user manual needed. Software $40; cookbooks $12 & up. Send for free catalog. *Vanilla Software, 3345 Lakeshore Ave., Dept. W, Oakland, CA 94610, 415/835-1953*

MICRO-GOURMET™
A complete culinary guide for the IBM PC. Create a personal recipe library, shopping list, create portion to portion comparisons. *Micro-Gourmet* has over 90 continental recipes, culinary terms, calorie guide, herbs & spices, & more. Home & restaurant use. Req. 128K, DOS, Disk Drive. Check or money order. $40. *DeAmicis Software Development, 4193 Galbar St., Oceanside, CA 92056, 619/758-4766*

Data Base

Call Costing Data Base
Customized data base for call costing. Intra & inter-lata, interstate, & international based on Federal & State tariffs & V&H coordinate system. Utilities included to create special rate tables. First year updates free. Complete data base $595. OEM discounts. Demo sample $49. *JCL Associates, P.O. Box 335, Contoocook, NH 03229, 603/746-4865*

Data Entry

Radar-II
RADAR-II is a powerful key-to-disk program that will do everything a 3741 or 5280 will do & more. Features: auto-duping, two-pass verification, accumulators for batch total checks, cross foot checks, check digit tests, data typing of fields, field tagging, operator stats., etc. Throughput permits 40,000 characters per hr. $995. *Southern Computer Systems, Inc., 2304 12th Ave. N, Birmingham, AL 35234, 205/933-1659, Telex: 755714*

RODE/PC Data Entry
RODE/PC is unmatched for power & ease of use. Menu-driven; pop-up help; heads-down speed; extensive input validation; automatic reformatting; conditional processing; operator stats; user exits; 029 keyboard & barcode options, much more. $40 demo. $595 first license, $395 each additional. Volume discounts. *DPX Inc., 20823 Stevens Creek Blvd., P.O. Box 656, Cupertino, CA 95015, 408/973-9292, TELEX 701111*

Data Entry System
Heads-down data entry for the PC will allow fast & accurate preparation of data files for your mainframe. Features: Auto dup, verification, auto format change, table lookups, range checks, batch totals, dup key, record insert, & much more. Ask us about our free 30 day trial period. Only $395. *Computer Keyes, 6519 193 SW, Lynnwood, WA 98036, 206/776-6443*

Data Management

PC-FILE III™
New for 1985, version 3.00 is faster than ever. Enhancements: 32767 record capacity, field size up to 1665 bytes, instant "snapshot" mailing labels, much more. Exchange data with *1-2-3, Word, WordStar*, etc. Over 100,000 copies of *PC-File* in use. Printed manual. $49 chk/MC/Visa. Toll free 24 hour order line: 800/JBUTTON. *ButtonWare, P.O. Box 5786, Bellevue, WA 98006, 206/746-4296*

LETUS A-B-C™
Data base containing AB-STRACTS of articles, Letters to Editors, Questions & Answers from ALL of the MAGAZINES about the IBM PC. Designed to be used with *PC-File III*, one easily searches on any subject, title, author, string, or "keyword". $75/6 disks/1982–2nd Qtr 1984. Updated quarterly $30/2 disks. Printed manual included. Check or company P.O. *Letus A-B-C, Dept. W, 3790 El Camino Real #2006, Palo Alto, CA 94306, 415/493-4306*

GOLDATAbase
GOLDATAbase is an easy to use DBMS for the IBM PC/XT. Data bases & reports are painted on the screen. Selection is by English-like commands. Procedures & a W/P interface are included. A BASIC Programmers Interface is available. With it, programs are written in BASIC that access *GOLDATAbase. Goldata Computer Services, Inc., 2 Bryn Mawr Ave., Bryn Mawr, PA 19010, 215/525-1036*

Data Security

N-CODE™ Data Security
Fast, ultra-secure data encryption system. *N-CODE* protects your files from unauthorized access or change. Encrypt/decrypt a single file or entire directory. Select or change coding key when you want. Unique password & coding system supplied. Demo disk $10. Uses DOS 2.X/3.X, 192K. $79.95 postpd. Visa/MC/chk. *K + L Software, White Flint Mall, P.O. Box 2303, Kensington, MD 20895-2303, 301/564-8669*

Protected by the CIA!!!
Controlled Information Access–a complete security system with multiple levels. Hide/encrypt files; protect entire diskettes with passwords, personal security codes, copy protection. Use any or all 5 methods on every system/data disk. 64K (DOS I.X) 128K (DOS 2.X). $49. Visa/MC. *Micro-Research Software, 9758 Longview Dr., Ellicott City, MD 21043, 301/465-8115*

Development Tools

BASIC? . . . BDS!
Our 3,000 customers wouldn't dream of working in BASIC without BDS. You won't either, once you try it! BASIC Development System (BDS) is GUARANTEED to improve your programming productivity or your MONEY BACK. Ask for a free reprint of the RAVE REVIEWS from *PC World* and *InfoWorld*. $125 ppd. MC/Visa. *BetaTool Systems, 8972 E. Hampden Ave. #179, Denver, CO 80231, 303/793-0145*

For BASIC Programmers
*F*I*F* (Fill-In-Formats) saves time! Easily create input screens, menus w/all options. A generated compact BASIC source code subroutine, compilable, handles entire input session w/user. One GOSUB gets you edited, formatted data. Price $49.95. Visa. PCjr, PC, 128K, 80 col. monitor. Manual, demos. *Siskiyou Software, 830 Garden Way, Ashland, OR 97520, 503/482-1908*

Dictionary

¢heapware™
WORD LIST: Almost 27,000 words from 3 to 15 letters consisting of all but proper nouns, hyphenated words & words w/ embedded foreign characters. Words are stored in random format supplied on a DSDD diskette. A utility to add, delete or change an entry as well as a display function are included. $19.95. For more info call the ¢heapware order line: *Robert L. Nicolai, 4038 N. 9th St., St. Louis, MO 63147, 800/622-4070, 800/942-7313 (IL)*

Disk Conversion

Converts CP/M to DOS
CROSSDATA converts any data/text file format from:

CP/M to MS/PC-DOS
CP/M to CP/M
MS/PC-DOS to CP/M

CROSSDATA reads/writes on IBM PC or clone using MS/DOS 2.00. CROSSDATA is a self-contained program. Ready to run, comes with 25 formats plus, you can add your own formats. To order this proven package, use MC/Visa or send

$99 to: *Award Software, Inc., 236 North Santa Cruz Ave., Los Gatos, CA 95030, 408/395-2773*

Edit

KEDIT
KEDIT is an XEDIT-like full screen editor for the PC. Split-screen editing of multiple files, targets, ARBCHAR, SCHANGE, GETFILE, SORT, wordwrap, prefix commands, block operations, key redefinition. Requires 80 column display, 192K. $125 + $3 shipping. Demo version $10. MC/Visa. *Mansfield Software Group, Box 532, Storrs, CT 06268, 203/429-8402*

PQfEDIT
Full-screen editor, the EDLIN alternative. Includes: 4-way cursor, char. insert/delete/replace, 4-way scroll, split/join lines, add/copy/move/delete lines, search/replace strings, get/put to disk, help screens. Edit multiple files at same time. Needs 80 column display, 128K, DOS. $45 + $2 shipping. *ADAM Systems Corp., 5919 Munson Court, Dept. 101, Falls Church, VA 22041, 703/379-0669*

Super Screen Editor
(SSE) is a full-featured screen editor including split-screens, 4 way scrolling, definable keyboard, macros copy/move/delete blocks of data (by line or column), file backup, line numbering, search/replace/undo, print utility, help screens: $99 + shipping. *Binary Corporation, 4091 126 Dr. N, Royal Palm Beach, FL 33411, 305/798-3100*

Educational

PC/Pilot
Language for education & training. Now offered also by IBM as IBM Pilot. Support for color, graphics, fonts, windows, files, video control. We offer upgrades, advanced feature library ($300), tutorial ($125), authoring prompter & unlimited campus/site license ($2000). *Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, 206/734-8248*

Hebrew/English/Greek
Type any language combination on your PC, Compatible, or jr. Highest quality letters—80 column. Works right to left and/or left to right (with or without vowels). Insert/delete, wordwrap, etc. Requires: 128K, DOS, graphics, Okidata, IBM, Epson, C. Itoh printer. Price, $149.95 ($15 for Demo). To order/for info call: *Gamma Productions, 817 10th St., Santa Monica, CA 90403, 800/227-1617, 800/772-3545 (CA), ext 129.*

Mr. Math
Four programs tutor basic math skills in arithmetic, money & fractions. Each program features 4 different games, optional step-by-step tutoring, annotated step-by-step solutions. All answers worked out directly on screen—no paper or pencil needed! 1dd, 64K (96K for 2.X) $34.95 ea., 2 for $65, 3 for $90, all 4 for $113. *TERM Computer Services, P.O. Box 725, New Providence, NJ 07974, 201/665-0923*

Intellectual Software
95 educational programs for IBM PC, PCjr, & compatibles, Grades K-adult, in reading comprehension, grammar, vocabulary, spelling, aptitude test preparation, history, geography, Spanish, health, reasoning skills, computer literacy, school administration, economics & business. Dealer inquiries invited. *Intellectual Software, Queue Inc., 798 North Ave., Bridgeport, CT 06606, 800/232-2224, 203/335-0906*

Teacher Turned Author!
Create great instructional courseware in minutes. No programming! Mix text, color graphics & questions on any page. Built-in drawing system or optional graphics tablet. Student recordkeeping, instant editing, & page playback. No royalties—produce unlimited courseware. PC & XT, $699. Demo disk, $15. *Raster Technology, Inc., P.O. Box 3477, Longwood, FL 32779, 305/862-2859*

TYPIST™—Teach, test
Unique touch typing tutor. Rapid advances in skill & speed. Experienced & beginner typists. Test & practice are analyzed with standard typing evaluation. Multilevel game. User prepared drills. Many options. Home, school, business. $49.95 + $3 ship. PC, XT, AT, PCjr. PC-DOS, 128K. *Choice Software, P.O. Box 726, Centerville, UT 84014, 801/292-7424*

Engineering

Structural Design
NEW—Fast, efficient, versatile structural analysis & design programs in spreadsheet format—BEAMS, COLUMNS & FRAMES of any material. Friendly input & output with data storage & COLOR graphics. Specify PC, XT or AT & send $25 for demonstration diskette to: *C-Squared B-Squared Software Design, Inc., 763 27th Ave., San Francisco, CA 94121, 415/751-1337*

Mech./Elec. Design
Programs for HVAC Loads, Building Energy Analysis, Faser Energy Acctng., Duct Sizing, Lighting, Short Circuit, Voltage Drop, Pipe Sizing, Critical Path Analysis, Life Cycle Costing, & more avail. for CP/M, CP/M-86, & MS-DOS computers. All disk formats supported. Demo disks avail. on each program for $33. Send/call for literature. *Elite Software, P.O. Drawer 1194, Bryan, TX 77806, Bus.: 409/775-1782, By Modem: 409/775-0760*

smARTWORK™
Printed-circuit artwork editor for double-sided boards up to 10" by 16"; runs on an IBM PC. Color display allows complete interactive control over the placement & routing process. 2X artwork can be made on a dot-matrix printer or pen-and-ink plotter. $895. Write or call for a brochure. *WINTEK Corp., 1801 South St., Lafayette, IN 47904-2993, 317/742-8428*

Electronics/Controls
ACNAP2—AC Circuit Analysis, $69.95
DCNAP—DC Circuit Analysis, $59.95
SPP—Linear/Nonlinear Transient Signal Processing, $59.95
PCPLOT—Pixel resolution screen, printer graphics, $59.95
PLOTPRO—Generic graph printing program, $49.95
Write for free catalog & signal processing booklet. *BV Engineering, 2200 Business Way #207, Riverside, CA 92501, 714/781-0252*

Eng./Sci. Graphics
Engineering/scientific graphics. *OMNIPLOT [S]* (screen graphics) & *OMNIPLOT [P]* (plotter driver) provide integrated eng./sci. 2D & 3D graphics w/NO PROGRAMMING! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, 3-D wire frame & more! $135 each. Both $240. *Microcompatibles, 301 Prelude Dr., Silver Spring, MD 20901, 301/593-0683*

EX-PROP
Complete PC Library for M.E.: EX-PROP for water prop. (all regions), EX-AIR for detailed psychrometrics, EX-GAS for comb. gas & hydrocarbon prop., HYPROP for hyd. parameters, EX-FOSS for boiler analysis. The most accurate & consistent properties avail. Meet all ind. stds.: ASME, ASHRAE, API, Intl. Skeleton tables. *Exergetic Systems, Inc., P.O. Box 2256, Novato, CA 94948, 415/897-0488*

XYZ^{3D}
Pictures of anything—any level of detail—in 3D. Completely general hidden line removal. Exact visual simulation. Any observation point—even within field of picture data. The most powerful PC graphics available. Used on mainframes by such groups as NASA, Dept. of Energy, Northrop, etc. Price $795. Demo $95. *Aariac Corporation, 5630 Arbor Vitae Blvd., Los Angeles, CA 90045, 213/568-0006*

Simulation
GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. Using GPSS/PC it is possible to predict the effects of managerial or engineering decisions on complex real-world systems. More than just a language, it is a simulation environment specifically designed for interactive use on today's high-speed microprocessors. $900. *Minuteman Software, P.O. Box 171/W, Stow, MA 01775-0171, 800/343-0664, ext. 4800 (U.S.), 800/322-1238, ext. 4800 (MA)*

Project Analyzer
Managers or engineers can now perform a complete economic analysis in minutes. The Analyzer computes: depreciation (allows split depreciation), tax credits, cash flow (before & after taxes), rate of return using the IRR (DCF) method, payback, & present worth of savings. $95. U.S. add $3, intl. $5 s/h. *Decision-Software, P.O. Box 278, Greenville, NC, USA 27835-0278, 919/757-0407*

File Transfer Service

We Transfer pfs Files
Save time & money! We transfer *pfs* files from the Apple to the IBM & compatible PCs. Other transfers available: *VisaCalc, 1-2-3,* CP/M *WordStar* to IBM. Call our support dept. for rates; ask for File Transfer Dept. *Forsythe Computers, 8514 Eager Rd., Ste. G, St. Louis, MO 63144, 314/962-9100*

Financial

Analyst's Assistant
Four fully automated, menu loaded Lotus *1-2-3* Templates. 1)Amortization Tables (payments in advance OR arrears). 2)Rule of 78ths Rebate Table. 3)Compute IRR, NPV, PV, Payback, & Accounting Rate of Return. 4)Compute the four standard Financial Statement Ratios. $250 ppd. $75 each. *Soft-Temp, Inc., 1121 East Jefferson St., Franklin, IN 46131, 317/736-4879*

IRA Money Maker
How to Get the Dollars Growing in Your IRA. Opportunity for More Retirement Income easily explained. You learn about interest rates, mutual funds & Your IRA. What was once known only to a few can now be Yours. *IRA Money Maker,* ONLY $39.95. IBM PC, 64K. Specify Color or B/W, 320K DSDD, Printer. *Knowledge Reach Associates, Inc., P.O. Box 3407, New York, NY 10185, 212/942-4692*

Business Library
A collection of fifteen valuable programs. Library includes Mortgages, Loans, Depreciation, Rule of 78, True Interest, Accelerated Cost Recovery, alternate ACRS, Present Values, Annuities, Rate of Return, & Auditing. Flexible & easy to use. Excellent documentation. $495 all fifteen programs. Write or call for brochure & license. *Advanced Management Systems, 2432 W. Peoria #1280, Phoenix, AZ 85029, 602/944-5594*

Forecasting

1,2,3 FORECAST!
Menu-driven template programmed in Lotus *1-2-3* macros. Forecasts time series data in existing *1-2-3* files. Fast & easy with little Lotus or forecasting experience. Linear & non-linear trends, regression, smoothing, decomposition, seasonal indices, diagnostics, more. 50 page manual includes tutorial & documentation. $75 chk/MO ppd. USA, more info: *1,2,3 FORECAST!, P.O. Box 12582, Salem, OR 97309, 503/585-8314*

Gambling

Play the Horses
A scientifically derived system for handicapping thoroughbred races. Many factors analyzed, ten found to be vital in picking winners. See *Popular Computing,* Feb. 1984 for review. Simple to use. Obtain "Daily Racing Form" & answer ten questions on each horse. Computer will print out odds. $29.95. *3G Company Inc., Rt. 3, Box 28A, Gaston, OR 97119, 503/662-4492*

Games

Hearts
3 computer players, 1 human. Computer: no random factor involved in cards played, plays cards within 2 seconds, shoots moon, defends against moon shots, tries to give queen to low man, does not cheat. No graphics. No color. Simple sound effects. 40 character lines. BASIC. Not protected. 96K. Disk. $20. *Andrew Lavis, 1443 Wake Forest #6, Davis, CA 95616, 916/756-5825*

Star Fleet 1
(The War Begins). "The world's most elaborate star battles game," (J. Pournelle–*Byte*-Sept. '84). Features color animation of battles, music, promotions, through ranks. Capture ships, lay mines, launch probes, rescue bases, repair damage, eliminate intruders, more! 98 pg. manual. Req. 128K, 1 drive, 80 cols. $49.95 + $2 s/h. *CYGNUS, P.O. Box 57825, Webster, TX 77598, 800/622-4070 (Nat.), 800/942-7317 (IL)*

Scatter
A challenging black box logic game. Using your reasoning powers, locate the hidden atoms by firing the laser into the box & deciphering the clues that come out. The sharper your deductive skills, the higher your score. A new puzzle each time–you choose the level of difficulty. $22. Visa/MC/chk. *SoftStart, P.O. Box 803, Framingham, MA 01701, 617/620-8315*

Wizzardz & War Lordz
At last–A new challenge! Lead your party of 6 adventurers thru the depths of a 15-level dungeon in 3-D graphics! Can they defeat in mortal combat the dreaded VYLGAR, & his henchmen? W & W gives new meaning to the word adventure. IF YOU DARE ... $49.95 + $2 p/h. IN 5% tax. 128K, DOS. Dealers inquire. *Ram-Tek Co., 6752(G) Covington Creek Trail, Fort Wayne, IN 46804, 219/432-2455*

Gas Stations

Station Master
Complete integrated bookkeeping system for gas stations. Quick, easy data entry automatically creates daily accounting. Reports shift check out, TBA, profit & margins. Has full inventory control, accounts receivable, payroll, P/L statement, & many other features. Great vertical marketing opportunity for dealers. *Small Business Computer Systems, Inc., 313 Llewellyn Rd., Ambler, PA 19002, 215/542-9639*

Genealogy

Family Reunion II
For IBM PC, XT, PCjr or compatibles. Keeps track of living relatives as well as geneological data. Produces pedigree charts, group sheets, descendant charts, address labels, birthday lists, text data, & much more! Price $129.95. Requires 128K & PC DOS 1.10, 2.00 or 2.10. Supports monochrome or color. Any printer. Visa/MC/AmEx/COD. Add $3.50 S&H. *Personal Software Co., 1580 East Dawn Dr., Salt Lake City, UT 84121, 801/943-6908*

Graphics

Grafmatic/Plotmatic
Grafmatic (screen graphics): 70 MS FORTRAN/Pascal (3.10, 3.20) IBM 2.00 or DR FORTRAN callable graphics routines. 100 page user manual. General utility, 2D interactive, total 2D plot support, 3D plots & solid models. $135. HP,IBM, HI plotter? Try *Plotmatic* for complete plotter capabilities. Use with *Grafmatic*. $135. Both, $240. *Microcompatibles, 301 Prelude Dr., Silver Spring, MD 20901, 301/593-0683*

PC-Title/PC-Projector
See *PC* mag's review (Dec. '83, pg. 619) of this tool for creating large, proportional text for slides, screen displays & fliers. Add graphics with PCcrayon. For all IBM PC models & compatibles. PC-Title/PC Projector (Ver. 2.00), $49.95. PCcrayon, $59.95. Order all three for $89.95. Visa/MC. *PC Resources, Inc., 620 Hobart Terrace, Santa Clara, CA 95051, 408/243-4169*

HALO
The most powerful library of subroutines under MS-DOS. Extensive functions include point, line, arc, circle, ellipse, hatch styles, pattern fills, clipping, dithering, world coordinates, image compression, multiple viewports, rubberband mode, etc. Compatible with multiple devices & languages. *Media Cybernetics, Inc., 7050 Carroll Ave., Takoma Park, MD 20912, 301/270-0240*

Dr. HALO
An easy to use icon driven paint program. Draw, cut & paste, paint, rotate, store & create images & symbols & use 8 flexible fonts. Internal grab & show programs let you edit images from other packages & prepare presentations. Runs on many graphics cards, input & output devices. $99.95. *Media Cybernetics, Inc., 7050 Carroll Ave., Takoma Park, MD 20912, 301/270-0240*

PLOTOGRAPHY™
Now PLOT your graphic drawings on paper or transparencies. Great for overhead presentations. Make them any size anywhere on the page, either direction. Will PLOT drawings from most graphic editors. Requires IBM PC, XT or PCjr. 128K, color board, floppy or hard disk, PC-DOS. Call to see if we support your plotter. Only $49.95. *Cactus Software Inc., P.O. Box 880, Peoria, AZ 85345, 602/242-7953*

Graphic Printer Support
Use the PrtSc key to produce scaled reproductions of your display on your Epson, IBM, Okidata, IDS, Datasouth, TI, HP, Toshiba, NEC, C. Itoh, etc. Supports IBM, Tecmar, or Hercules graphics cards. $49.95. Visa/MC. *Jewell Technologies, Inc., 4451 53rd Ave. SW, Seattle, WA 98116, 206/937-1081*

ExecuVision
Make your next presentation effective & memorable with *ExecuVision* Presentation Graphics System. Pick from library of thousands of pre-rendered images, or sketch your own. Draw logos, make graphs & charts, add text with 10 fonts, "cut & paste" & animate–all in 64 color combinations. For IBM PC & compatibles. *Visual Communications Network, 238 Main St., Cambridge, MA 02142, 617/497-4000*

Flowcharter
EasyFlow is a computer aided flow chart generation tool. Charts up to 5 by 11 shapes in size, automatic line routing, automatic text centering within shapes, 100 pg. manual plus many more features than we can mention here. Runs with all printers on any MS-DOS or PC-DOS machine. $49.95 U.S. *HavenTree Software Ltd., RR 1, Box 105, Feeley's Bay, Ontario KOH 2NO Canada, 613/542-7270, ext. 45*

XYZ3D
For: Architects, designers, planners, civil engineers, landscapers, environmentalists, facility planners, cartographers, engineers, scientists, computer professionals, artists, managers, animators, and many more. See description under Engineering Section. *Aariac Corporation, 5630 Arbor Vitae Blvd., Los Angeles, CA 90045, 213/568-0006*

Art Organizer:
Most powerful CAD/GRAPHIC EDITOR of its kind. Line, circle, ellipse, arc, copy, paint, undo, symbol library, hardcopy & 40 more extensive functions. Guaranteed to save 10 times more file space than most graphic tools. Pictures can be read back by BASIC programs. $89.95. Requires: 128K, color card, 1 drive, PC/XT/AT. *Rosa Software, 14245 SW Walker #22, Beaverton, OR 97006, 503/643-7964*

Executive Picture Show
Easily the most powerful & distinctive free-form drawing & presentation graphics package, with its ability to create menu-driven presentations using literally hundreds of animated drawings, graphs, etc. Ideal for slides, displays, hard copies. IBM PC & compatibles. TRY IT OUT FOR ONLY $15! Retail $245. *PCsoftware, 9120 Gramercy Dr. #416, San Diego, CA 92123, 619/571-0981*

MetaWINDOW™
Advanced graphics toolkit provides Xerox Star/Apple Macintosh style graphics on your IBM PC. Supports most popular graphics cards. Create pop-up menus, windows & icons; use proportionally spaced fonts; rubberband & drag lines, text or bitmap images; supports mouse/cursor tracking. Tightly optimized for use w/Turbo Pascal, IBM Pascal, C, Fortran & BASIC. *Metagraphics Software Corp., 444 Castro St. #400, Mountain View, CA 94041, 415/964-1334, Telex: 4998586 METAGRAF*

Home Use

Shop Cheap–Eat Smart
- COUPONOMIZER–Save more money with your discount coupons & rebates. 64K.
- DIET ANALYZER–Lose those extra pounds! Tracks calories + 23 nutrients. Ideal for menu planning. 128K.

Immediate shipment, 2 week money back trial. $49.95 ea. + $2.50 s/h. AmEx/MC/Visa. Call for free brochure. *Natural Software Ltd., 7 Lake St. #7E, White Plains, NY 10603, 800/626-2511, 914/761-9329*

Insurance

The Agency Manager™
Designed by insurance professionals for independent insurance agents, this integrated system performs customer & company accounting, General Ledger, Client/policy data base, over 100 marketing reports & sales tools, ACORD's, IVANS, single or multiuser, IBM XT, CP/M. *Applied Systems, P.O. Box 400, Monee, IL 60449, 312/534-5575*

Inventory Control

Mr. QuarterMaster
Features: receipts & issues updating; inventory, reorder & usage reports; screen display of stock item(s); price quotes, & invoices; reorder points adjusted automatically & file maintenance to add, change & delete stock items. List Price: $120. Manual alone: $20. Free brochure. *RJL Systems, 106 New Haven Ave., Milford, CT 06460, 203/878-0376*

Inventory Manager II
Ideal stand-alone program perfect for retailers, wholesalers or any business involved with merchandise sales. Up to 9999 items. Generates numerous reports including ave. cost & ave. sale, gross profit, margins, stock on hand, on order, sug. & actual P.O.s & more. Sort utility. Floppy (vers.) $199. XT $299. *Satori Software, 5507 Woodlawn N., Seattle, WA 98103, 206/633-1469*

dFeller Inventory
A business inventory program written in *dBASE II* source code, so you can modify the program to fit your particular needs. The menu-driven program lets you locate items by inventory name or number. It keeps track of reorder points, vendors, average cost, & other information. List price, $150. Requires *dBASE II* or *dBASE III*. *Feller Associates, 550 CR PPA, Route 3, Ishpeming, MI 49849, 906/486-6024*

Investment

Rental Property
Considering an investment in real estate? Lets you build financial projections. Shows before & after tax Cash Flows, Profits, Internal Rate of Returns, & such. Assumptions can be changed for each year. SIMPLE menu-driven, & yet sophisticated. Template–you must have a spreadsheet. Specify *Multiplan* or Lotusl. $29.95. *TimeSaver Software, 4470 Chamblee-Dunwoody Rd. #315, Marketing Dept., Atlanta, GA 30338*

Labels

¢heapware™
Type up to 5 lines of text in any of 3 type faces & 4 fonts on 1 x 2¾" labels. Program can insert a serial number or text from a sequential file on labels. Dot matrix printer & HiRes color monitor req'd. Program diskette, instruction booklet & box of 3,000 labels only $45 postpaid. For more info call the ¢heapware order line. *Robert L. Nicolai, 4038 N. Ninth St., St. Louis, MO 63147, 800/622-4070, 800/942-7313(IL)*

Languages

PC Pascal Examples
Examples Plus for IBM Pascal I or PLUS2 for IBM Pascal 2 & DOS 3.00. Each contain over 300K bytes of useful info including more than 60 sample progs. Save time & effort, learn the easy way. Available for $30 each or both for $48. (CA add 6%) or send $3 (refund with order) for complete description. *Jato Inc., 24861 Alicia Pkwy. #272-A, Laguna Hills, CA 92653*

BetterBASIC
- Structured language with BASIC syntax
- Extensible-create own keywords
- Modular-procedures can be grouped together into library modules
- Utilizes full PC memory capacity (640K)
- Full screen editor w/multi-window display capability
- Full support for graphics, comm. screen format./$199.

Summit Software Technology, Inc., P.O. Box 99, Babson Park, Wellesley, MA 02157, 617/235-0729

muLISP-83
An integrated environment for AI software development. Includes a high performance, pseudo-code LISP compiler; a resident, screen-oriented editor & debugging system; interactive LISP programming lessons; & a detailed reference manual. $250. Also available, the muMATH Symbolic Math System, $300. *The Soft Warehouse, P.O. Box 11174, Honolulu, HI 96828*

Legal

Legal Billing
Complete time billing package for firms with up to 18 lawyers. Features exclusive "video time-slip" for "magic quick" entry. Prints detailed client statements, lawyer time & client aging reports plus more. Large record capacity. Trust accounts & automatic interest. Very friendly. $450. *Satori Software, 5507 Woodlawn N., Seattle, WA 98103, 206/633-1469*

LawLib
Build your own legal opinions & precedents data base. Written by a lawyer, menu-driven & very friendly. Comprehensive manual. Minimize work duplication & the unwitting giving of contradictory legal advice. Search by Statute name, by Statute name & Section #, & by Keyword. Screen or printer reports. Installation & Keyword-list utilities. For PC, XT or AT. $250 Visa OK. U.S. *ZYVAK Corporation, P.O. Box 2516, Station D, Ottawa, Ontario K1P 5W6 Canada, 613/523-4210*

Lotus

Lotus™ User?
Free Mail Order Catalog for Lotus software users. 4-5-6 WORLD specializes in Lotus software, templates, general purpose & specialized Lotus enhancement programs, books, training aids, hardware & accessories. *4-5-6 WORLD, Dept. A-103, P.O. Box 22657, Santa Barbara, CA 93121, 800/524-5678, 805/564-2424 (CA)*

Without System Floppy
Run Lotus' *1-2-3* & *Symphony* on your hard disk system without using a floppy. Be confident that your valuable spreadsheet data is accessible (even if your floppy is damaged). *Waltz* program emulates both Lotus "system" floppies (not an alteration or fix). $29 MC/Visa/chk. Includes shipping. Req. DOS 2.00 or higher. *Yellow Bus, Inc., 1618 Roman Point, Norcross, GA 30093, 404/923-0764*

Mail List Programs

Pony Express XL
For commercial & large lists. Fast machine code multisort. Prints labels 1-5 across, single line or user-defined format. Also CHESHIRE FORMAT. Multi file merge. Records can be selected by user-defined codes, zips or zip ranges. Auto repeat for ease of record entry, corrections & deletions. Phone list option. $238. *Computech, 975 Forest Ave., Lakewood, NJ 08701, 201/364-3005*

Bulk Mailer
This is the most sophisticated mail list program available, & the only one to offer these features: Duplication elimination, up to 32,000 name capacity, coding capability, multi-label formats, zip & alpha sorts, easy to use plus much more. Floppy version (5400 names) $99. XT version (32,000 names) $350. *Satori Software, 5507 Woodlawn N., Seattle, WA 98103, 206/633-1469*

Label Master
Maintains 65,000 records on hard disk, 1100 per floppy disk. Sorts by zip code & last name. Prints mailing labels (1 to 4 across), directories, & envelopes. All printers. Checks for duplicates & accurate state/zip codes. Many other features. Requires 128K free memory. Only $35. Fact sheet available. *RKS Associates, 3820 N. Dittmar Rd., Arlington, VA 22207, 703/532-1877*

Lynn's E-Z Mail
Menu-driven/fast/all machine code/multipurpose/EZ to edit, search, delete records. Sort or search records by name, city, state, zip, phone #, data line. Print labels 1, 2, 3, 4 across. Print alphabetical phone directory. For IBM PC & compatibles. Visa/MC/chk. Only $49.95. *Lynn Computer Service, 6831 W. 157 St., Tinley Park, IL 60477, 312/429-1915*

Manufacturing

MCBA Software System
Adapted for the IBM PC using MS-DOS. Inventory Management, Bill of Materials, Order Processing, Purchasing, Job Costing, MRP, Labor Performance, Shop Floor Control, Standard Product. Costing & Routing, Accounting. Install. & support available. In use at over 11,000 installations! *MDM Systems, Inc., 24525 Southfield Rd. #205, Southfield, MI 48075, 313/557-1254*

Manufacturing Inventory
Designed with the small to medium sized manufacturing firm in mind, MISys is big enough to handle your needs, yet costs only $995. Integrated Inventory Control, Bills of Material, Purchase Orders. For IBM PC/XT & compatibles. Multiuser versions also available. Dealer inquiries invited. *Microcomputer Specialists, Inc., 18 Lyman St., Westboro, MA 01581, 800/833-1500, 617/366-1200*

Twin Oaks mrp2
- Bills/Material
- Inv Control
- Purchasing
- MRP & CRP
- Master Sched'g
- Phys Inventory
- Std Costing
- 22 Modules
- 128K PC or XT
- DOS 1.10, 2.00
- Hard/Soft Disk
- Online-Real Time
- Multiuser
- Acctg Interface

Twin Oaks Inc., Box 136, Cottage Grove, MN 55016, 612/458-1604

MFG. Control System
A comprehensive system for repetitive or job shop type manufacturers consisting of: B/M, Inventory, Order Processing, Purchasing, Mat. Req. Planning MRP, MPS, Shop Floor Ctrl. & CRP, Cost devel., Job & W/O Costing, Accounting. 1 yr. warranty included. Train & consult avail. Compare our system & prices for best value. *Production Systems Inc., 410 Macklyn Ave., Santa Rosa, CA 95405, 707/526-1294*

Production Planning
MANCOMP introduces the menu-driven & integrated Aggregate Production Plan & Rough-Cut Capacity Plan. Utilizes variable planning parameters. Develops multiple "what if" plans. Applicable to small & large manufacturers. IBM PC (256K) & *1-2-3*. Visa/MC. $150 with 30 day refund policy. *MANCOMP Planning Systems, Inc., P.O. Box 6768, Athens, GA 30604, 404/546-9067*

Stat Process Control
Statistical Process Control is now available with THE CONTROLLER™. This is the only software package that not only generates the traditional control charts but also accepts observations about the process in a special comment section. Dump or load data to *1-2-3*, *dBASE II*, *VisiCalc* etc. $250 complete with tutorial manual. *Management Institute of Chicago, Inc., P.O. Box 713, LaGrange, IL 60525, 312/579-1488*

Mathematics

Optimization
Optisolve solves nonlinear systems of equations & maximizes or minimizes nonlinear functions with nonlinear constraints. It can find all solutions, including complex ones. No programming language is required; the user simply inputs the problem directly in terms of symbolic equations & inequalities. $195. *Optisoft, Franz Ste. 203, 2920 Domingo Ave., Berkeley, CA 94705*

Mega Math
A library of over 40 assembly language subroutines for fast numeric calculations on IBM PC/XT/AT & compatibles. Includes matrix & vector rou-

tines, Fast Fourier Transform, convolution, solution of linear equations, scalar & transcendental operations. Use with Fortran, C, & Pascal compilers. *Micray Electronics Ltd., Bay 1, 4001A-19th St. N.E., Calgary, Alberta T2E 6X8 Canada, 403/250-1437*

Medical

Threshold
Medical office management. Features automatic insurance claim preparation, teleprocessing to Blue Shield and Medicare, unattended statement processing, total security, statistical reports, inquiry management reports & on-line help. FREE REMOTE DEMONSTRATIONS AVAILABLE. List $3,995. *Physicians Practice Management, Inc., 1810 S. Lynhurst Dr., Ste. Q, Indianapolis, IN 46241, (Nat) 800/428-3515, (IN) 800/792-3525*

PC*CLAIM
Physicians' office insurance claim filing with printed insurance forms & paperless claims processing. Overnight electronic claims submission. Speeds Blue Shield, Medicare, private insurance settlement. 23 programs, 3 diskettes, user manual, DOS/128K/modem/2 floppies or hard disk $229.95. $-back guarantee. *Physicians Practice Management, Inc. 1810 S. Lynhurst, Suite Q, Indianapolis, IN 46241, 317/246-0357, 800/792-3525 (IN), 800/428-3515 (Nat.)*

General Medical History
A utility which acquires & prints out the past medical history, family history, medications, allergies, previous hospital admissions, social history, habits, etc., & a very detailed review of systems with a branching pursuit of specific complaints. The printout can be attached to patient records after being verified by the attending physician. *Cogitum Medical Software, 1675 Leahy St. #328, Muskegon, MI 49442, 616/725-9525*

Threshold* ™
Basic accounts receivable, patient billing, insurance preparation/electronic claims to Blue Shield & Medicare. Add-on modules available. Completely upgradable from *PC* Claim*. IBM PC/XT. $1995. *Physicians Practice Management, 1810 S. Lynhurst, Ste. Q, Indianapolis, IN 46241, 800/428-3515 (Nat), 800/792-3525 (IN), 317/248-0357*

CYBERLOG
The Quarterly of Applied Medical Software. A medical publication to increase professional effectiveness. 50 pg. text, 2-4 disks, one medical process per issue, 4 issues/year. Physician authored. Tutorials, case studies, & more. Charter subscription $525. Demo disk $25. Bill/Visa/MC/AmerEx. *Cardinal Health Systems, Inc., 7562 Market Place Dr., Minneapolis, MN 55344, 800/328-0180, 612/941-5170*

Menu Systems

MenuMaster
Create custom menus for IBM PC & XT applications quickly & easily. You love PC-DOS, but do your users? MenuMaster supports complex job streams, run-time prompts, real-time clock display, hard disk, color, graphics & more. Menu system req. IBM PC, 64K, 1 disk. Menu editor (creates & modifies menus) req. 192K. Full system, $175. Demo disk & documentation, $25.00. MC/Visa. *DecisionWare, P.O. Box 505, Moorestown, NJ 08057, 609/778-0799*

Screen Development Aid
For Compiled & Interp BASIC. A full screen editor & powerful assembler subroutine support monochrome & graphics.
- Create & Test Screens 40/80
- Automate Screen I/O
- Generate Color
- Display Help Screens
- Perform Field Edits

PC, XT & compatibles, 96K, 1dd, IBM & MS BASIC, DOS 1.10-3.00. $79. MC/Visa. *Dependable Systems, P.O. Box 191090, San Diego, CA 92119, 619/287-3391*

Menu System for XT/AT
Unlimited no. of user defined menus. Single keystroke choices. Written in C. Fast. Screen saver function. Color or B & W. Menus changed with your word processor. Detailed manual shows easy & complicated tasks. Price $39.95. Dlr./Qty. disc. available. Req. DOS 2.0+, 64K, 1 disk drive. MC/Visa/PO. *Cottage Industries, Inc., P.O. Box 176, 407 Gordon, Liberty, MO 64068, 816/792-1550*

K-QUAL Menu Manager
Easily execute programs on XT, AT, or compatibles. One stroke selects application, second selects program. Windows, custom menus, online help, password security, DOS interface + directory search. Runtime prompts, hardware analysis, displays time, backup, restore, & print utilities. Req. hard disk, 64K, DOS 2.0+. $49.95 + $5 s/h. MC/Visa/AmEx. *Superior Consultants, 6711 7th Ave., Brooklyn, NY 11220, 718/372-6512*

Multitasking

Tascmaster Software
Multitasking IBM PC or IBM PC/XT. Operating under PC-DOS, allows up to 9 tasks to be run concurrently in background mode unattended. Can work in *WordStar*, do a calculation from *1-2-3*, monitor modem, data base sort & month-end closing from Accounting Program all at once. Price $475 including Addram Plus or Addram Elite multifunction board. *Profit Systems, Inc., 30150 Telegraph Rd., Birmingham, MI 48010, 313/647-5010*

Music

TuneSmith/PC™
Make GOOD Music on any IBM PC or compatible! It's easy with this amazing Music Development System. There's an ON-LINE TUTOR to guide you + a HELP screen. Simulated CHORDS allow you to create complex music. Special Full-Screen Music EDITOR; 10 Sample TUNES to entertain & educate! Req. 96K, 1 drive, 80-col display. $49.95 + $5 s/h. Visa/MC/AMEX. *Blackhawk Data Corp., 307 N. Michigan Ave. Dept 3A, Chicago, IL 60601, 800/328-5727 ext. 132, 800/742-5785 ext. 132 (MN)*

Nutrition

Diet and Health
Our software puts you in control of your nutrition in ways impossible before. Now everything is at your fingertips to make it easy to follow diets, control weight, or simply live better. Includes data base of 15 nutrients & 800 foods + 100 pg. user & nutrition guide. PC/MS-DOS, AP/DOS, CP/M. Professional Pkg. $120-$349. Personal Pkg. $40-$120. *Nutritional Data Resources, P.O. Box 540, Willoughby, OH 44094, 216/951-6593*

Printers

PrinScil
PrinScil is a user-friendly, menu-driven system which enables users to quickly tailor the appearance of their output on IBM, Epson, & other dot matrix printers without knowledge of printer codes. User selections can be saved for later use without having to go back into the menu system. $29.95 for single printer version. Visa/MC. *SofScil™, P.O. Box 5712, Kent, WA 98064-5712, 206/631-4212*

Set Printers With Ease
PRINTSET™, the software pkg. that lets you take command of your dot matrix printer. Set *all* print types, fonts, line-spacing, margins, tabs & much more quickly & easily. Available for Epson, IBM, OKIDATA & other printers. Specify make & model. *Only* $29.95, manual & updates included. *EaseWare Development, Ltd., P.O. Box 274, Vilas, NC 28692, 704/264-1898*

Public Domain

Public Domain "Freeware"
Rent hundreds of games, utilities, & business programs that aren't copyrighted, and therefore are in the public domain. Copy them yourself & save! RENTALS: IBM PC SIG–220 Vols. $225. IBM PC BLUE–71 Vols. $85. Rental is for 7 days after receipt, 3 days grace for return. Credit cards accepted. 50 5" floppy disks, $100. *National Public Domain Library, 1533 Avobill Dr., Vista, CA 92083, 619/727-1015, 24 hr. order, 619/941-0925, customer service*

Real Estate

Property Management +
A new easy-to-use system for single or MultiFamily properties. Print checks, rent statements & receipts reports—late rents, expired leases, vacancies, income/expenses & operating statements. Includes a bank reconciliation feature & graphics capabilities. Up to 70% reduction in management time. $675. *Realty Software Co., 1926 S. Pacific Coast Hwy. #229 Redondo Beach, CA 90277, 213/372-9419*

Management & Analysis
"Real Property Management" $395, for apts., offices ... Records & projects income/expenses/budget by month/account/unit. No retyping of recurring monthly data. "Real Analyzer" $195, is 5 programs in 1 for analysis of Income Property and the Residence. Easy WHAT IF. PC/XT/jr. 30 day money back guarantee. Visa/MC. *Real-Comp Inc., P.O. Box 1263, Cupertino, CA 95015, 408/996-1160*

Investors/Syndicators
Let your computer calculate the right price. A complete analysis: cash flow, taxes, projections, & syndication feasibility. All values easily changed for risk analysis or structuring an offer. A powerful tool for making sound investments. $250. Manual & demo disk, $35. IBM PC & CP/M computers. *DRF, Inc., 3333-F Soquel Dr., Soquel, CA 95073, 408/475-4456*

EZ-RE Investor Templates
Real Estate Investor Templates. Equity Share, Houses, Apartments, Warehouses, Office Bldgs. 10 year projection of cash flow, deduction, tax at sell, after tax IRR. Expenses, int., rent & apprec. adjustable annually. Mortgage types—ARM, FHA 245, amort, deferred int., int. only. Professional report. Req. *1-2-3*. $ back guar. $50 ppd. Visa/MC. *LB Associates, 8817 Skokie Lane, Vienna, VA 22180, 703/938-9093*

Property Managers
Two systems to match your exact property management needs. *Rental Manager* handles all tenant activities; features built-in general ledger. Flexibility allows multiple properties per owner. *Condo Manager* is designed for community associations. Handles member payments, charges, & generates accounting reports. *Coleman Business Systems, 3654 Arcadian Dr., Castro Valley, CA 94546, 415/581-7125*

Real Estate Brokers
Five packages to help real estate brokers identify prospects, match homes to prospects, appraise homes, prepare an individual financial analysis of home & investment property purchases, & manage a real estate office. QUARRY. 5 programs @ $95 each; demo disk $35 deductible from first purchase. Dealer inquiries invited. *Queue Inc., 798 North Ave., Bridgeport, CT 06606, 800/232-2224, 203/335-0906*

Sort

Opt-Tech Sort/Merge
Extremely fast Sort/Merge program for the IBM PC. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts dBASE II files! Compare before you buy any other. Write or call for more info. $99. *Opt-Tech Data Processing, P.O. Box 2167, Humble, TX 77347, 713/454-7428*

Spreadsheet

THE FIX for Lotus!
Run *1-2-3* & *Symphony* on your IBM XT, AT, TI Professional or compatible hard disk system without using your Lotus System disk in the A: drive. THE FIX protects your valuable Lotus System floppy disk & loads *1-2-3* faster; PC-DOS/MS-DOS 2.00 AND 1.00. $34.95 + $5 shipping & handling. *Blue Heron Publishing Co., 8350 Lincoln Ave., Skokie, IL 60077, 312/676-1080*

Integrated Env.–$49.95
AnalytiCalc offers 3D spreadsheet, equation solving, data base, WP integration, graphics, matrix math, more. Virtual memory techniques manage 2M. Over 150 funct/cmds. Every cell programmable. Requires 256K, PC-DOS 2.00, DSDD disk, or order 320K version with area naming. Not copy prot. $49.95 + $5 s/h. NJ add 6% tax. *General Cybernetic Engineering, P.O. Box 748, Mt. Holly, NJ 08060*

Statistics

Statistician's Mace 2.00
A *full-feature* program. Calculate multiple regression, correlations, several ANOVAs, nonparametric tests, descriptive stats, data transformations & much more. Read data from keyboard or files created by spreadsheet, data base, WPs, etc. For IBM PC, XT, AT, PCjr & compatibles. Buy direct or from dealers. $195. *The MAtrix Calculating Engine (MACE) Inc., 2313 Center Ave., Madison, WI 53704, 608/241-4566*

BMDPC
BMDPC Statistical Software is a comprehensive package of programs that provide researchers with numerous statistical methods, ranging from simple data display & description to advanced statistical techniques. BMDPC programs are designed for ease of use & to handle all steps in an analysis. *BMDP Statistical Software, 1964 Westwood Blvd. #202, Los Angeles, CA 90025, 213/475-5700*

GAUSS™
GAUSS is a HIGH PERFORMANCE, FULL-FEATURED matrix programming language for IBM PC. Uses the 8087. EXTREMELY FAST–10 to 15x faster than IBM APL. STATE-OF-THE-ART numerical routines. EASY TO LEARN–uses standard mathematical syntax. INTRODUCTORY PRICE–$250, with 30 day money back guarantee. *Applied Technical Systems, P.O. Box 6487, Kent, WA 98064, 206/631-6679*

P-STAT
P-STAT combines data & file management, data display, statistical analysis, report-writing & survey analysis capabilities in a single package. P-STAT is used internationally for a variety of applications. P-STAT runs on the PC/XT & PC/AT. Multiple copy discounts & site licenses are available. *P-STAT Inc., 471 Wall St., P.O. Box AH, Princeton, NJ 08542, 609/924-9100*

SL-MICRO
The Statistical Language for Microcomputers can quickly process large data bases. It has Frequencies, Descriptive Statistics, Crosstabs, Pearson Correlation, Anova & Multiple Regression. Data Editor & Data Transformations. Runs on IBM PC, XT & compatibles. $250. Manual $15. Free Info. *Questionnaire Service Company, Box 778, East Lansing, MI 48823, 517/641-4428*

RATS!
RATS is a fast, accurate & comprehensive regression package with unsurpassed POWER. Has both time-series & cross section analysis. Includes Box-Jenkins, logit, & probit. Spectral analysis & graphics available as options. Requires 256K RAM, IBM PC or compatible. Base program: $200. MC/Visa. *VAR Econometrics, Inc., 134 Prospect Ave. S, Minneapolis, MN 55419, 612/822-9690*

Stock Market

Winning on Wall Street
Fast, easy, sophisticated system for making money in the market. *Trader's Data Manager*, data base for all securities. Auto download. *Trader's Forecaster*, technical analysis. Charting. *Trader's Accountant*, 10 Reports. Simulations. *Winning on Wall Street-The Complete System*, integrates all three. $15 DEMO. *Summa Software, P.O. Box 2046, Beaverton, OR 97075, 800/792-2211, 503/644-3212 (OR)*

COMPUSTOCK™
Fundamental Stock Analysis Program • Projects Earnings & Dividend Growth • Buy & Sell Signals • Calculates Return • Establishes Risk-Return Relationships • Flexible Input • Real Stock Examples. IBM XT, PC, PCjr, 128K, Color Monitor, DOS 2.00 • Demo disk $20, Program $95. *A.S. Gibson & Sons, P.O. Box 130, Bountiful, UT 84010, 801/298-4578*

Survey

Do Surveys With Your PC
People Facts: *The Opinion Processor*. Find out what people think about your company, products, services. Create survey questionnaires, process results. Easy to use, all essential statistics. $395. Full-feature preview $25. Call or write for details. *Shamrock Press, Division of Karl Albrecht & Assoc., 1277 Garnet Ave. #206-P, San Diego, CA 92109, 619/272-3880*

Systems

Multiuser PC-DOS
MultiLink turns PC-DOS into an efficient multi-user multitasking operating system. Additional users are supported by attaching inexpensive CRT terminals or modems to serial ports on the PC, and can run normal applications designed for PC-DOS. Includes host communications software for public dial-in. *Software Link, Inc., 8601 Dunwoody Place #336, Atlanta, GA, 30338, 404/998-0700*

Tax

A Tax Planning Template
Diskette used with *1-2-3* or *Symphony*. User can toggle between 1983 & 1984 law; includes both year's tax tables. Computes state income tax. 256K req. Flexible, menu-driven. Follows IRS forms by line. Includes 1040 schedules: A,B,C,D,E,G,W,SE; forms 2106,2441,3468,4562 & 6251. Send $75. MC/Visa. *PERSONAL TAX PLANNER, Permar & Associates, 1125 Sunnyhills Rd., Dept. W, Oakland, CA 94610, 800/443-0100, ext. 644*

TurboTax™
Full feature Federal tax prep & planning software. 33 forms plus multiples. FAST! Calculates complete return under 3 secs. WINDOWS! Exceeds IRS print specs. Operates like a spreadsheet. Full depreciation support. Much more. (CA/AZ module avail. Don't pass up this one). Req. 256K. $65. Visa/MC. (CA res. 6% tax). *ChipSoft, Inc., 5674 Honors Dr., San Diego, CA 92122. To order: 800/621-0852, ext. 355, 619/453-8722*

TAXTIME for *1-2-3*™
* (formerly Tax 4-5-6)
1040-REG 256K $35
* 1040,A,B,C,D,G,SE(2),W,62
* 51, + IRA,EIC worksheets.
1040-PRO 320K $95
* Above + C,E,F,R,2106,2210,
* 2441,3468,3903,4562,4797,
* 5695. Auto support state-
* ments. Multi C,F, & 4562.
* All forms IRS approved.
* See next 3 ads:

State Tax Forms
CALIF-540 256K $95
* State forms 540,540NR,A,B,
* CEF,D-1,G,H,P,R,3514,38
* 05L,N,U,X,3885,5805.
NY-201/203 256K $95
* New York forms IT-201,201
* ATT, + non-res 203,203ATT,
* NYC203,112R,220,250,360.

Corporate Tax Forms
CORP-1120 320K $195
* 1120,1120S,C,D,W,2220,
* 3468,4255,4562,4626,4684,
* 4797,K-1. 2 complete programs.
* Available March 1985.
PARTNER-1065 256K + $195
* 1065,D,F,K,K-1s,4684,4797.
* Stores indiv. partner data
* & prints K-1s. State info
* can be added. Avail Feb.85.

Order Information
* All forms highly integrat-
* ed. Most IRS/State apprvd.
* All forms updated in 10
* seconds after calc. Two
* line window always shows
* tax totals. Extensive use
* of menus & macros allows
* easy input/output. Needs
* LOTUS *1-2-3*™ 1A &
* memory listed. Annual updates.

TAXTIME™ by Austin Scientific, 1259 El Camino #260, Menlo Park, CA 94025 USA 800/227-2634 x 998 CA 800/772-2666 x 998

1-2-3 Tax Template
Full text display for easy use with IBM PC. Form 1040; schedules A-G, R, SE and W; forms 2106, 2119, 2441, 3468, 4562, 4797, 1040A, 1040EZ & more. Separate "What if" worksheet integrates 1040 with schedules, macros, & tax table lookups. Send $49.95 in check or money order to: *Marietta TaxTime, Inc., P.O. Box 71354, Marietta, GA 30007*

Tax Preparation Template
1984 Federal tax template for use with *1-2-3*. Follows IRS forms & schedules. WRITTEN DOCUMENTATION prepared by former IRS ATTORNEY-CPA: explains template; includes tax checklists of income & deduction items; examines frequently asked questions & tax issues relating to specific line items. $99. Visa/MC/chk. *1-2-3 TAX MISER, United Bank Professional Center, P.O. Box 620835, Littleton, CO 80162, 303/972-0539*

IR$LOG
Use your PC to keep exact monthly logs of your computer time. IR$LOG keeps user ID, description, times & dates, whether private business, employee, charity. Itemized or summary print-outs, on-line help, simple. IBM PC, XT, AT, PCjr, COMPAQ, 128K, any DOS, any 80 column printer. Chk/MO, $25 ppd. *pbprograms, 1215 Lane Blvd., Kalamazoo, MI 49001, 616/349-9720*

Business or Pleasure?
If you claim PC expenses on your tax return, you need SYSLOG, the System Log Utility. With SYSLOG all of your computer time is recorded, saved and categorized. Reports printed for tax purposes or for monitoring PC usage. Business or pleasure? No sweat. When the IRS asks, give them your log. Only $29.95 + s/h. Visa/MC. *APEX Resource, 23 Christine Court, Stormville, NY 12582, 914/221-2611*

Income Tax
TAXWORKS–the 10 min. 1040
Easy! Fast! Accurate!
Prints ready-to-file returns.
- Federal & CA
- PC-DOS, MS-DOS, CP/M 80
- Individual $100/prof. $500
- 1983 Demo $25

Save time & money!
Order TAXWORKS
Hollingsworth Business Services, 881 Alma Real Dr., Ste. T-2, Pacific Palisades, CA 90272, 213/459-2746, 800/232-"1040" in CA

AccuTrax™
- Tax Planning Software
- Records Checks & Receipts
- Written in C. It's fast.
- 64 Accnts(Displayed on Scrn)
- Print reports by accounts, months, & more.
- Automatic search & matching of checks to receipts
- Searches & sorts by 7 fields
- Manual Incld. Tax Deductible
- Cost $59.95. Visa/MC/chk

Chase Systems, 2445 Ashborne, Toledo, OH 43606, 800/235-6646, ext. 623; in CA, 800/235-6647, ext. 623

Templates

1-2-3/Symphony Templates

Make Instant Use of Your
Lotus Spreadsheet
Practical Applications

1. 1985 Fed Tax Calculator
2. Personal Acct. System
3. Personal Mailing System

$35 ea. 2 or more On One Disk $30 ea. Visa/MC. 30 day money back guarantee.
Easy-As ... Inc., 36 S. Charles St. #402, Baltimore, MD 21201, 301/539-5540

1-2-3 and Multiplan

Make use of your spreadsheets without the time & hassle of template design. We have many extensive templates, including:

- 1984 Tax return–free updates next year
- Small Business Master Budget–10 schedules
- Investment Portfolio Manager
- Property Management
- Small Business Accounting
- Others

Send $19.95, ea. in chk/MO to: *KENSA Group, 1950 S. York #204, Denver, CO 80210, 303/698-9647*

Terminal Emulation

VT100 on PC, PCjr, AT

ZSTEMpc-VT100 Smart Terminal Emulator. 132 columns by windowing–no addit. hardware. Double high/wide chars. Full VT100 line graphics & smooth scrolling. 2-way file transfers incl. Xmodem. Full keyboard softkeys/macros. Speeds to 38.4K. $150. Quantity discounts avail. 30 day money back guarantee. MC/Visa. *KEA Systems Ltd. #412-2150 W. Broadway, Vancouver, BC V6K 4L9 Canada, Support 604/732-7411, Orders 800/663-8702*

VT-102 & 4010 Emulation

PC 102 turns an IBM PC/XT/AT/jr to a VT-102/100/52 terminal with printer/file transfer support. Optional: 132 col., 4010 graphics support. Guaranteed compatibility with all VT-100/52 applications including EDT, WORD11, All-In-One, DEC-CALC, & UNIX. Exceptionally easy to use. 3000+ sold. From $89. Visa/MC/COD. Call for free info package! *General Micro Systems, P.O. Box 5330, Hopkins, MN 55343, 612/944-0593*

HP/DEC

PC 2622 workstation management system provides HP 2622 block mode & VT 102 terminal emulation; file transfer software for HP 3000 & DEC VAX along with X modem support & powerful command language. Available for WANG, IBM, HP, DEC, TANDY & DATA GENERAL ONE computers, $295 or $395 depending on version. *Walker Richer & Quinn, Inc., 1914 North 34th #201, Seattle, WA 98103, 206/634-0503*

Tools

Zentools

Intuitive, elegant & powerful. Word processor, spelling checker, & spreadsheet software tools for your IBM PC or compatible, by author of well-known high ticket packages. Integrated: learn one & learn all. $29.95 each includes professional documentation & templates. Visa/MC. *Knowledge Engineering, Inc., P.O. Box 3138 #231, Austin, TX 78764, 512/328-0100*

Pascal-to-C Translator

Convert UCSD Pascal, MT + Pascal, & others to K&R C. Handles nested procedures, intrinsic functions, separately compiled units & modules, all data types including long integers. Requires 256K IBM PC/XT/AT. Send for free samples or send us up to 500 lines of Pascal & we will convert it for you for FREE. Licensed source & executable code $5000, conversions 25 cents/line. *TGL Inc., 4400 Sulphur Springs Rd., Corvallis, OR 97330, 503/745-7476*

Typesetting

MP-X Micro Composer

MP-X Photocomposition System with ICL ON-LINE Driver for the Autologic APS-5™ and MICRO-5™ typesetters. Features: • 103 commands • stored formats • merge copy • hyphenation (algorithm & exception word dictionary) • automatic leading • virtual fonts • auto pi • redefinable keyboard. For more details call or write: *Micro Print-X, Inc., P.O. Box 581, Ballinger, TX 76821, 915/365-2343.* ™ *Autologic, Inc. Trade Mark*

High-Tech Typesetting

Transmit your text via toll-free lines directly to our fully automated typesetting system. $2 per K characters with a $5 minimum. Same day service. 200 typefaces in sizes up to 72 point. Send $15 + $3 shipping for our 220 page guidebook, or call toll free & use your MC/Visa/AmEx. *Intergraphics Inc., 106A South Columbus St., Alexandria, VA 22314, 800/368-3342, or 703/683-9414 in DC area.*

Utilities

Peeks 'n Pokes for the PC

A customer told us "Peeks 'n Pokes is the best bargain in *PC World*." We think you'll agree! Discover how to access and modify the status of the PC. Perform DOS and BIOS function calls from BASIC or Pascal. Learn how to find more Peeks 'n Pokes and much more. Disk (58 programs) and manual $30 + $2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860, for orders only: 800/421-5300, ext. R96.*

The Inside Track

Another bargain! Give your programs speed and control. Read files as fast as DOS, display data faster, load programs faster, control memory use, run any program from your program, copy-protect your disks and much more. Fold-out memory map too! Disk (61 programs) and manual $45 + $2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860, for orders only: 800/421-5300, ext. R96.*

Disk Mechanic

The ULTIMATE Floppy Disk Backup & Repair Utility. Can back up ALL software protected disks written on the IBM PC. Works manually or automatically. Files or sectors can be restored, searched, examined & changed. Checks disk drive speed. Requires IBM PC, DOS 1.10(128K)/ 2.00(192K), + 64K if only 1 floppy drive. $73 Ppd. USA. For info/MC/Visa: *MLI Microsystems, P.O. Box 825, Dept. PCWD, Framingham, MA 01701, 617/926-2055*

DOSshell

Fixed Disk Users: No time to organize your fixed disk or learn confusing DOS commands? *DOSshell* is the original disk organizer that works with DOS version 2.00 or 3.00. The directory structure, menus, function key assignments & utilities give you an organized base to grow with as your system & needs grow. Disk & manual: $35. Demo Disk: $1. Visa/MC. *XTC Software, P.O. Box 902, Santa Barbara, CA 93102, 805/967-7837*

Padlock/Padlock II Disks

PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands. $99. PADLOCK II disks come preformatted with fingerprint & serialization. PADLOCK II disks offer superior protection. Ask about our fast data encryption product. All work w/hard disk, EXE/COM files & all DOS versions. MC/Visa. *Glenco Engineering, 3920 Ridge Ave., Arlington Hts., IL 60004, 312/392-2492*

Sideways Printing

Print spreadsheets, text files, etc., sideways on your IBM/Epson printer with the DigiCon Print Package. Easy menu setup for selecting character style & size, margins, more. Includes character editor to create your own styles. Also, quick printer setup utility. All for $49.95 (PA + 6%), chk/MO. *Digital Concepts, Inc., P.O. Box 8345, Dept. C, Pittsburgh, PA 15218, 412/823-8314*

Cogitate Dump/Restore-XT
Seven programs make hard disk backups quick & easy. COGBKUP supports multiple positive & negative wildcards & runs up to 50% faster. COGTREE gives an interactive graphic or hardcopy display of directory trees. Other programs make this a complete backup system. Only $90. Visa/MC. *Cogitate, Incorporated, 24000 Telegraph Rd., Southfield, MI 48034, 313/352-2345, Telex #386581*

MATIS, Screen Manager
70 Assembler subroutines used as BASIC commands, PROCEDURES in C & PASCAL, & CALLS in Assembler. Features: window management, screen design, control of video attributes, screen loading from & saving to disk printer utility, demo program. 170-page manual. $150 + $2.50 shipping. (CA add 6.5%) Visa/MC. *Softway, Inc., 500 Sutter St. #221, San Francisco, CA 94102, 415/397-4666*

¢heapware™
BASIC CREF–Will format & print source code & all literal variables in it w/line number cross reference. If program fails to work as documented, you may get a refund of the purchase price. Hard copy $9.95; disk version $17.50 w/compiled code $22.50. Compiled code scans any program in under 3 minutes. For more info call the ¢heapware order line. *Robert L. Nicolai, 4038 N. 9th St., St. Louis, MO 63147, 800/622-4070, 800/942-7313 (IL).*

Copy II PC 2.00
Copy II PC is the backup insurance you need to protect your software investment. *Copy II PC* makes a backup of most protected software quickly & easily, & even allows several to be run from a hard disk (call for current list). For IBM PC, XT, AT, 256K jr. Also available for Apple //, Mac, C64. $39.95 + $3 s/h. Visa/MC/chk. *Central Point Software, Inc., 9700 SW Capitol Hwy. #100W, Portland, OR 97219, 503/244-5782*

OH-Windows for C
Powerful window function library as easy to use as printf. Color, B & W, Mono. 65 windows on 4 pages. Overlay, disk save/restore, print, titles, borders, line or page scrolling. Detailed manual w/application. Minimum system overhead. MS C, Lattice C, C86. $74.95. Demo $5. PC/XT. MC/Visa. *CAB Concepts, 125 Main St., Ste. F, Bay St. Louis, MS 39520, 800/824-3609*

ParseGen and XREF
ParseGen LALR(1) parser table generator accepts large grammars. Source & object code for the parser provided. $200. XREF produces multi-file cross-references. MS-BASIC, MS-FORTRAN, MS-Pascal, & Turbo Pascal source files are accepted. The listing shows assignments, definition points, etc. $50. *Arrow Software, 2393 Ralston Ct., San Jose, CA 95148, 408/238-5373*

Stop Paging thru Manuals
Get all the HELP you need with one keystroke without leaving your package/application. Create/Modify CUSTOM HELP with built-in editor. Multiple subtopics ZOOM in for increasing detail. Select, view & print HELP topics. Comes with DOS 2.00. Additional modules available. $50 + $5 s/h. *Flex Software Systems, P.O. Box 347158, Parma, OH 44134*

PIK'r
Fast Formatting Tool: PIK'r selectively moves mainframe data (or any report) into spreadsheet & data bases without rekeying. Supports *1-2-3, dBASE II & III,* DIF, *Multiplan,* word processors. Powerful editing features. Comprehensive manual, extensive on-line help. Mouse support. $95 MC/Visa. *SAMKHYA Corp., 47 Sixth St. Box 142, Petaluma, CA 94953, 800/442-0012, 800/442-5544 (CA)*

¢heapware™
BASIC Printer–Input any ASCII, Binary or Protected program to create a new disk file, utility will print or display output. Unprotect any file saved w/ the ,P option in BASIC & create a binary image of the file on disk. Req. 64K, 1 disk, dot matrix printer & Hi-Res monitor (color optional). $20 postpaid w/machine readable documentation. *Robert L. Nicolai, 4038 N. Ninth St., St. Louis, MO 63147, 800/622-4070, 800/942-7313 (IL)*

R:base Utilities
RBmenu organizes your R:base forms & reports into easy-to-use menus. One keystroke to run complex reports with up to 5 levels of sorts & wheres. Also invoke other programs, DOS commands, batch files. Menu editor, run-time prompts, color. Requires Microrim R:base 4000. $125. Visa/MC. *McCarthy & Associates, 5909 Carter Ave., Bakersfield, CA 93308, 805/324-4291*

Retraction Statement
RTCS has erroneously used the Intel trademark "iRMX" to describe or name some of its products. All RTCS products that use that trademark now use "RTX" instead.

Fast, Smart XT Backup
BAKUP™ does daily backups in less than 5 min; a full (10M) backup in less than 30 min. Uses floppy disks, cartridge disks, etc. on XT, AT or compatible. Unique catalog of backed-up files speeds restoration & prints backup reports. Includes 50 diskette labels. 30-day money-back guarantee. $149.95; Visa/MC/PO/COD. *InfoTools, Inc., for more info: 408/725-1151; to order: 800/538-8157, ext 801 (USA), 800/672-3470, ext 801 (CA)*

dWINDOW©
8K assembly language program adding 20 NEW WINDOWING SYNTAX statements to *dBASE II*—User defined in-memory & disk-based, tree-structured WINDOW files • Executable DOS command at .prompt • CAPTURE full/part screen • Create Menus w/ READ BAR capable • Fully compatible w/dBII .PRG files. Spec: IBM PC, XT, AT; dBII (2.40 or 2.41). $135 ($3.50 ship), chk/MC/Visa. *Liberty Bell Publishing, P.O. Box 69306, Dept. E, Portland, OR 97201, 503/241-2211*

Word Processing

PC-Write™ 2.30
Fast, friendly, flexible. On screen, justify, page break. Fast scroll, save, search. Keyboard macros. Split screen. Footnote. Standard files. Tutorial, 120 page manual, 9 help screens. Software, manual on disk $10. Register for bound manual, support $75. Visa/MC. Ok to copy & share with others! *Quicksoft, 219 First Ave. N. #224, Seattle, WA 98109, 206/282-0452*

MY WORD!™ Just $25!
Get a WS-like word processor for the IBM PC/XT/jr or compatibles (even Tandy 2000). Sort, mail merge, quick print; use 256 char.! Word wrap, 100+ operations, won't lose text, ASCII files. Manual with index included. Source code: just $25 more! 96K, 1 drive, DOS 1.10-2.10. 30-day money back guarantee. *T.N.T. Software, Inc., 34069 Hainesville Rd., Round Lake, IL 60073, 312/223-0832*

forMath™
- formats articles, books, theses in science/engg.
- on dotmatrix, daisywheel, laser printers, typesetters, CRTs
- automatically sizes & places matrices, ratios, integrals, equations, footnotes
- numbers chapters, equations, references
- multiple fonts/sizes, symbols, macros, indexes, tabs, hyphenation

$400. *Shantha Software, Inc., 50 West 97th St. Room 11N, New York, NY 10025, 212/222-SNIP, toll free (metro areas): 950-1088-wait-FORMATH*

Word Processor Link
Create a letter *and* envelope in as little as 25 seconds using PenPal and *your own* WP software. Print labels. Store forms. Do mass mailings with *built-in mail merge.* Use PenPal and WP without exiting to operating system. Includes: file manager and address book. $179. *Raytec Computer Services, 9560 Black-Mountain Rd. #132, San Diego, CA 92126, 800/621-0852, ext. 939*

Tape/Disk Conv.

Conversion Services

Mag tape to disk conversion. Any 9 track 1600 BPI MAGNETIC TAPE converted to:

8" CP/M	IBM 3740
DISPLAY WR.	WANG
IBM SYS/??	IBM PC
ZENITH	APPLE
TELEVIDEO	MORROW
ALTOS	KAYPRO
MACINTOSH	XEROX
NORTHSTAR	TRS80

Disk to disk & disk to tape conversion avail. on 200 formats. *Pivar Computing Services, Inc., 47 W. Dundee Rd., Wheeling, IL 60090, 312/459-6010*

Micro-Mainframe Conv.

When you need data from your mainframe to your microcomputer, or from the micro to the mainframe, AMWORK provides the answer. AMWORK will convert any 9 track 1600 BPI magnetic tape to 5¼" disks or convert 5¼" disks to 9 track tape. All work is guaranteed to specifications. Also CP/M DOS conversions. *AMWORK Systems Inc., 606 Palace St., Aurora, IL 60506, 312/897-0977*

Data Conversion

The DATA CONVERSION CO., will quickly & accurately convert your data from/to *9-track tape/cards/5¼" or 8" diskettes or disks* for a minimum of *$35. DCCO* has been doing unique & special requests at the same location for *14 years*. It's as easy as dialing *800/223-8348, or in CA, 213/250-7806. DCCO, a division of W E Data Services Inc., 119 North Belmont, Los Angeles, CA 90026*

Tape or Disk to DOS

We copy from 9-Track Reel Tape, 800/1600 BPI, ASCII/EBCDIC, AND from virtually any Soft-Sectored 5¼" or 8" CP/M diskette to PC-DOS or MS-DOS 5¼" 1.X or 2.X or 8" diskette. We can copy from PC-DOS/MS-DOS also. Apple II, II+, IIe with DOS, CP/M or Pascal & IBM 8" as source/target is also our forte. *Professional Data Services, 385 Woodley Rd., Santa Barbara, CA 93108, 805/969-6993, 9:30 to 5:30 PST*

Tutorials

VCR Computer Tutors

Use your VCR with your computer as your personal tutor. Step by step detailed instruction. Learn at your own pace. VHS or BETA. EW-8 using *Multiplan*, EW-2 using *VisiCalc*, DB-3 using *pfs:File*. Only $39.95 each. Visa/MC/chk. *Lynn Computer Service, 6831 W. 157 St., Tinley Park, IL 60477, 312/429-1915*

Typesetting

High-Speed Typesetting

Your computer is now your own personal typesetting terminal! You control all typesetting parameters. Our automated Compugraphic equipment offers high speed & top quality. Excellent for: • Newsletters • Directories • Catalogs • Documentation • Books Friendly, personal service. Send your file direct to our BBS. Call our BBS for more details, or write for free brochure. *Cimarron Graphics, P.O. Box 12593W, Dallas, TX 75225, BBS–214/691-5092*

JL Network

Telecommunicate your manuals, catalogs, high tech pubs. to a specialist. Save time, save money. Fully paginated, camera-ready output. Call today. Ask about our "Instant Proof" service! Visa/MC. *JL Network, 373 Main St., Salem, NH 03079, 800/637-0707*

PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

FORMAT: *The standard format includes a product ID, a 300-character descriptive ad, and company name, address, and telephone number.*

Advertisers may choose among categories already in use, or they may create their own. Display advertisers can cross-reference their current ad to the PC World Directory *for increased exposure at low cost.*

RATES: *Listings are accepted for three-time consecutive insertions at a rate of $891 ($297 per issue). We offer a six-time insertion, 15 percent discount contract for a total of $1500 ($250 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.*

DEADLINE: *For copy deadlines, contact a* PC World Directory *sales representative at 415/861-3861 or 800/872-7808 (CA), 800/872-7800 (nat'l). Please send copy and prepayment to* PC World Directory, *555 De Haro St., San Francisco, CA 94107.*

PC WORLD

Reader Inquiry Service

PLEASE
PLACE
STAMP
HERE

PC World
P.O. Box 13897
Philadelphia, PA 19101

PC WORLD

Reader Inquiry Service

Would you like further information on a product that's advertised in PC World?

Well, it's easy and best of all—FREE!

Just follow these simple instructions:

- Print or type your name and address on the attached card. One card per person, please.
- Circle the number(s) on the card corresponding to the Reader Service number in either the Advertiser Index or Product Index.
- Drop the card in a mailbox and wait to receive the literature that will be mailed to you free of charge from the manufacturer.

The address on the attached card is for product information only. Send editorial comments or inquiries to: PC World, 555 De Haro St., San Francisco, CA 94107.

PC WORLD

Name

Company

Address

City State Zip (Zip code needed to insure delivery)

Valid through 7/29/85

☐ Please bill me $23.75 for a 1-year (12 issue) subscription to PC World (U.S. and Canada only).

JHKA8
1, 2, 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525
526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625
626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675
676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725
726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750
751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775
776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875
876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925
926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950
951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975
976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

May 85

Advertiser Index

Reader Service Number

— ALF Products, Inc., 42
18 AST Research, Inc., 79
19 AST Research, Inc., 12-13
22 AST Research, Inc., 108
41 Aha!, Inc., 359
315 Alloy Computer Products, Inc., 68-69
930 Alpha Omega, 216
6 Alpha Software Corporation, 10
204 Amdek, Inc., 22
7 American Training International, 15
10 Apparat, 358
205 Applied Computer Products, Inc., 164-165
12 Applied Software Technology, 217
825 Arlington Computer Products, 98
867 Ashton-Tate, 238
119 Atlantis Software, 257
28 Autodesk, Inc., 20-21
207 BASF Systems Corp., 203
230 Bellsoft, 162
975 Boeing Computer Services, 316
721 Borg Industries, 358
954 Borland International, 51
760 Borland International, 53
955 Borland International, 54-55
808 Brother International, 320
178 Brown Disc Manufacturing, Inc., 112
865 Bulldog Computer, 387
31 Central Point Software, Inc., 90
999 Citizen America Corp., 62-63
166 Coefficient Systems, 300
43 Comark, Inc., 135
613 Comark, Inc., 332
879 Command Technology, 317
— Compumail, 380
856 Compuserve, 323
82 Computational Systems, Inc., 38
158 Computer Hut of New England, 382
990 Computer Integration Association, 326

Reader Service Number

951 Computer Inventory Control, Inc., 386
420 Computer Mail Order, 381
210 Computer Plus, 90
146 ComputerAid, Inc., 357
554 Conroy-LaPointe, Inc., 146-147
276 Contemporary Computerwear, 52
646 Control Data Corporation, 315
49 Corvus Systems, Inc., 275
110 Creative Microsales, 340
— Curtis Manufacturing, 353
33 Dac Software, 306
973 Dayna Communications, 72-73
58 Diamond Software, 337
829 Digigraphics Systems Corp., 235
957 Digital Equipment Corp., 40-41
— Direct Net, 330
880 Discount Computer Center, 354
780 Disk World, 360, 385, 388
199 Diversified Computer Systems, 358
176 Dow Jones & Company, Inc., 276
973 Dow Jones & Company, Inc., 334-335
493 Ecosoft, Inc., 336
214 800 Software, 327
699 Everex Systems, Inc., 19
969 Fidelity Investments, 52
854 4·5·6· World, 357
71 Fox & Geller, 14
532 The Futures Group, 359
976 GSN Computers, 359
125 Gaan Computer Supply, 357
927 General Micro Systems, 359
78 Genest Technologies, 162
994 Genoa Systems Corp., 67
161 Golden Sea Electronics, 357
996 Gould, 106
978 Great Salt Lake Computer, 383
891 H & E Computronics, Inc., 25
77 Hercules Computer Technology, 27, 39
— HowardSoft, 204
781 IBM, 173
830 IBM, 8-9
979 ICN Systems, 318
153 IDEAssociates, 46
963 Impulse Computer Products, 194
949 Infocom Business, 28-29
83 Information Builders, Inc., 237
624 Inner Loop Software, 359
780 Int'l Union of Computer Owners, 385

Reader Service Number

228 Intek, 355
178 Intek, 355
5 Irwin Magnetics, 202
81 ITSoftware, 205
967 Jeden, 352
— Kamerman Labs, 1
941 Kimtron, 57
93 Lifetree Software, 201
995 Logicsoft, 116
965 Logistics Software, 357
— Lotus Development Corp., 43
100 MBP Software, 325
793 MCP Applications, 384
117 Mannesmann Tally, 163
989 Mark Data Products, 358
578 Maxell Corp., 30
98 Maynard Electronics, 5
— McGraw-Hill, 101
971 Media Cybernetics, 329
233 Micro Data Base Systems, Inc., 338-339
223 Micro Direct International, 75
112 Micro Mart, 390-391
108 MicroFlash, 392
118 MicroWay, 117
40 Micrografx, Inc., 35
939 Micromission, 100
103 Microprocessors Unlimited, 358
116 Microshop, 233
— Microsoft Corporation, 6-7, 97, 99, 102-103
188 Microstuf, Inc., 66
834 NCR Corporation, 190-191
— Nec Home Electronics, 81-84
124 Nec Informations Systems, Inc., 192-193
958 Oberon International, 157
950 Opt-Tech Data Processing, 357
894 Opt-Tech Data Processing, 359
133 Orchid Technology, 56
136 PC Connection, 180-183
— PC Connection, 185
460 PC Network, 312-313
626 PC Pipeline, 359
737 PC Warehouse, 346
34 PC's Limited, 389
576 Pacific Exchanges, 358
694 Panasonic Industrial, 127
— Paparback Software Int'l., 299
— Paradise Systems, 302
— Parlor Software Co., 359
286 Peachtree Software, Inc., 295
960 Peripheral Marketing, Inc., 50
142 Persoft, Inc., 85
575 Photon Software, 18
797 Pico, 26
241 Polaroid Corp., 44-45
164 Polaroid Corp., 76-77
956 Polaroid, 317
804 Polytron Corp., 347
— Princeton Graphic Systems, 105, 107, 109, 111, 113
225 Princeton Graphics, 16
— Progressive Micro Dist., 96
68 Progressive Micro Dist., 378-379
688 Prometheus Products, 145

Reader Service Number

198 QED Information Sciences, 34
226 Quadram, IFC
195 Quadram, 24
149 Quadram, 342
— Quaid Software Limited, 336
583 Quarterdeck, 88-89
907 Qubie', 36-37
328 Rainbow Technologies, 358
726 Rickard Software Group, 359
162 RoseSoft, Inc., 91
431 SBT Corporation, 328
113 SL Waber, 333
844 SPSS, Inc., 234
165 SSI, 319
282 STSC, Inc., 343
281 Samna Corp., 92-93
920 Seaside Software, 341
886 Secure-It, Inc., 356
225 Sigma Design, 16
169 Sigma Design, 48
— Simon & Schuster, 33
187 Skyland Systems, 356
144 Soft-Help, Inc., 297
850 Soft/Plus Research, 357
173 SoftCraft, Inc., 303
816 SoftStyle, Inc., 114
811 Softrak Systems, Inc., 236
862 Software Bottling, 314
526 Software Link, 240
— Software Publishing, 17
726 Software Shop Systems, 357
823 Sorcim/IUS, 258-259
— The Source, 350
922 Space Coast Systems, Inc., 356
319 Star Micronics, 310-311
185 Statewide Micro, 115
8 The Stress Manager, 357
308 SubLOGIC Corporation, 331
890 Summit Software Technology, 65
— Sysgen, Inc., 305
70 Systems Management Assoc., 104
959 TRW, 119
190 Tecmar, IBC
997 Teknika, 87
921 Telasoft, 78
— Texas Instruments, 118
219 Third Floor Systems, 351
285 Toshiba America, Inc., 348-349
707 Tseng Laboratories, Inc., 322
261 Univation, 298
— VLM Computer Electronics, 358
193 Ven-Tel, Inc., BC
— Walonick Associates, 356
196 Warner Software, 309
45 Watcom Products, Inc., 307
— Yes Software, 49

HOW TO BUY B

PC SYSTEMS

IBM PC
w/256K, two 360K drives, controller, keyboard, monochrome/printer adapter, monochrome monitor $2195

IBM PC
w/256K, two 360K drives, controller, keyboard, color/graphics adapter, hi res color monitor $2495

IBM PC
w/256K, two 360K drives, controller, keyboard, 10MB internal hard disk drive w/auto boot $2795

These systems are brand new, shipped fully tested and burned in, fully warranteed for ninety days AND ARE ALWAYS IN STOCK!

IBM PC AT Many configurations ..... *

AT&T 6300 & 7300 Many configurations ..... *

PRINTERS

EPSON
FX-80 (160 cps narrow carriage dot matrix) $425
FX-100+ (160 cps wide carriage dot matrix) $625
RX-80 (100 cps narrow carriage dot matrix) $245
LX-80 (100 cps, near LQ, select type controls) ..... *
RX-80 F/T + (100 cps narrow carriage near LQ w/platten) $295
RX-100 (100 cps wide carriage dot matrix) $425
JX-80 (160 cps narrow carriage color dot matrix) $575
LQ-1500 (LQ dot matrix w/ parallel interface) $1150

OKIDATA
ML 92 (160 cps narrow carriage dot matrix) $425
ML 93 (160 cps wide carriage dot matrix) $625
ML 84 (200 cps wide carriage dot matrix) $725
PACEMARK 2410 (350 cps wide carriage dot matrix) $1995

DATAPRODUCTS
8010, 8020, 8050, 8070 ..... *

TOSHIBA
P-1340 (120 cps narrow carriage LQ dot matrix) $745
P-1351 (192 cps wide carriage LQ dot matrix) $1295

TEXAS INSTRUMENTS
TI-855 (150 cps narrow carriage LQ dot matrix) $699

BROTHER
HR-15+ (17 cps narrow carriage letter quality) $395
HR-25 (23 cps wide carriage letter quality) $650
HR-35 (32 cps wide carriage letter quality) $895
2024L (New high speed dot matrix) ..... *

C.ITOH
Starwriter (40 cps letter quality) ..... *
Printmaster (55 cps letter quality) ..... *
Ask about C. ITOH's Hot New Line at New Prices!

DIABLO
630 API & ECS ..... *

NEC
Pinwriter P-2 & P-3 ..... *
Spinwriter 2050, 3550, 8850 ..... *

QUME
Letter Pro 20 (20 cps narrow carriage letter quality) ..... *
Sprint 11/40+ & 1/55+ (wide carriage letter quality) ..... *

Ask about our full line of tractors and cut sheet feeders!

PLOTTERS

AMDEK
Amplot II (6 pen Lotus compatible plotter) $595

HEWLETT-PACKARD
HP-7470 & 7475 (2 pens/6 pens) ..... *

HOUSTON INSTRUMENTS
DMP 29, 40, 40-2, 41, 42, 51, 52 ..... *

FLOPPY DISK DRIVES

TANDON TM 100-2 (Double sided/double density 360K) $149
CONTROL DATA (Double sided/double density 360K) $149
HALF-HEIGHT (PC/XT/AT/PORTABLE compatible double sided/double density)
CHOOSE FROM NAMES LIKE SHUGART, TEAC, PANASONIC ..... from $119

HARD DISK DRIVES

PEACHTREE PERIPHERALS
P-10i/e (10MB internal/external hard disk with auto boot) $695/795
P-20i/e (20MB internal/external hard disk with auto boot) ..... *
P-30 AT (30MB internal AT compatible hard disk) ..... *

MAYNARD
MaynStreamPortable Tape Back-Up ..... *

EMERALD SYSTEMS
PC & AT compatible, up to 280MB, with or without tape back-up ..... *

SYSGEN
Quickfile 60MB Streaming Tape Back-Up ..... *
Image XT cassette tape back-up $745
IIG/10 (External 10MB hard disk with tape back-up) $2395
IIG/20 (External 20MB hard disk with tape back-up) $2795

TALLGRASS
TG-3020, 3135, 3170 (Hard disks with tape back-up) ..... *

BERNOULLI TECHNOLOGY
Single and double 10MB removable media subsystems ..... *

Call for any brand that you don't see listed!

MULTIFUNCTION BOARDS

AST RESEARCH
Advantage (AT compatible memory expansion with options) ..... *
Six Pak w/64K (64-384K, serial, parallel, C/C, opt. game) $259
MegaPlus w/64K (64-512K*, parallel, C/C, opt. p,s,g) ..... from $259
I/O Plus II (Serial, C/C, opt. serial, parallel, game) ..... from $135

ORCHID TECHNOLOGY
Blossom w/64K (64-384K, serial, parallel, C/C, opt. PC Net) $259

QUADRAM
Quadboard w/64K (64-384K, serial, parallel, game, C/C, bracket) $259
QuadMeg (AT memory expansion up to 4MB) ..... *
QuadPort (AT serial and parallel, opt. 4 more serial) ..... *

PERSYST
Time Spectrum w/64K (64-384K, serial, parallel, C/C, 2 yr wrty) ..... *

MICROLOG
Baby Blue II w/64K (64-384K, Z80, 2 serial, parallel, C/C) $429
Little Red Ram (0-256K memory expansion) ..... *

MAYNARD ELECTRONICS
Complete line of Sandstar modular multifunction boards ..... *

TALLTREE J-RAM II & II X ..... *
Fill'er up with RAM and save!

CHIPS

64K (nine chips) $30
8087 (coprocessor) $159
128K (AT RAM) ..... *
256K (jr & AT boards) ..... *

GRAPHICS CARDS

TSENG LABS
UltraPAK (132 col. mono graphics, serial, parallel, C/C) $439
UltraRAM, UltraDISK, UltraSERIAL (options for UltraPAK) ..... *
ColorPAK (Ultra hi res color graphics) ..... *

PERSYST
BoB Board (beautifully clear text on a color monitor) ..... *

HERCULES
Graphics Card (Lotus compatible monochrome graphics) $319
Color Graphics Card (Short-slot color card w/parallel) $179

PARADISE
Modular Graphics Card & Multi-Display Card ..... from $299

AST
MonoGraphPlus (Monochrome Lotus graphs, parallel, C/C) $369

STB
Graphics Plus II (Monochrome & color w/ parallel, software) $299

QUADRAM
Quadcolor I & II (Upgradeable color cards) ..... from $189

TECMAR
Graphics Master (Hi res Lotus compatible color & mono) ..... *

OUR POLICY

1. WE ACCEPT VISA, MC, AMEX; No surcharge for VISA or MC.
2. COD requires cash or certified check; Company check when approved.
3. Allow 1 week for personal and company checks to clear.
4. Wiring information available upon request.
5. Corporate, Government and Institutional volume purchase agreements available.
6. Call for exact shipping charges; air shipments take priority.
7. If we must split shipment, you incur no additional shipping charges.
8. All orders shipped insured — No additional charge.
9. All products fully warranteed; Some up to 5 years.
10. All items subject to availability; Prices subject to change without notice.

*Call for current price.

ETTER VALUES.

PROTOCOL CONVERSION

AST RESEARCH
PCOX, 5251, 3780, BSC, SNA ..... *

DCA
Irma (3278 Terminal Emulation) $895
Irmaline, Irmalette, Irmaprint, Irmacom ..... *

TECHLAND
Blue Lynx 5251 model 12 & 3276 ..... *

Call our experts for all your Micro-to-Mainframe needs!

NETWORKING

We carry all the best names including AST RESEARCH and ORCHID TECHNOLOGIES. Call our Networking Applications experts to design a cost-effective device-sharing networked layout for your office!

MONITORS

AMDEK
300G & 300A (Green or Amber, composite video monitors) $129/139
310A (Amber TTL input, non-glare tube) $169
COLOR 600 (13" 640 X 240 RGB w/text button, audio) $425
COLOR 700 (13" 720 X 480 RGB w/.31mm dot) $475
COLOR 710 (13" 720 X 480 RGB, non-glare, non-flicker) $575

QUADRAM
Amberchrome (Amber TTL input, non-glare tube) ..... *
Quadchrome HX-12 (690 X 480 RGB w/.31mm dot) ..... *

PRINCETON GRAPHICS
PGS MAX-12 (Amber TTL input, non-glare tube) $189
PGS HX-12 (690 X 480 RGB w/.31mm dot) $449
PGS SR-12 (690 X 480 non-interlaced RGB w/.31mm dot) ..... *

TAXAN
RGBvision 420 & 440 ..... *

Ask us to find the right monitor/graphics card combo for your application!

MODEMS

Hayes Smartmodem 300 (external 300 baud, auto answer/dial) $199
Hayes Smartmodem 1200 (external 300/1200, auto answer/dial) $419
Hayes Smartmodem 1200B (internal 300/1200, w/Smartcom II) $379
Hayes Smartmodem 2400 (external 2400 baud) ..... *

ANCHOR AUTOMATION
Signalman Mark XII (300/1200 baud at 300 baud price) $259

AST
Reach (Short-slot 300/1200 baud w/CROSSTALK, self-test) ..... *

BIZCOMP
Intellimodem ST (Fully Hayes compatible internal 300/1200) $349
Intellimodem XL (Internal 300/1200, simultaneous voice/data) $399

RIXON
300/1200, 2400, and 4800 baud modems ..... *

MISCELLANEOUS HARDWARE

POLAROID Palette (Makes color slides from your PC's screen) $1395
ORCHID PC Turbo (adds 8MHz processor, multitasking to PC) $825
KEYTRONIC KB 5151 keyboard w/separate cursor keys) $195
TOUCHSTONE TECHNOLOGY (Touchstone 1 (num/cursor key pad) ..... *
MOUSE SYSTEMS Optical PC MOUSE (w/PAINT, Pop-Up Menus) $155
MICROSOFT Serial or Bus mechanical mouse (w/Mouse Menu) $155
SAFT Power Back-ups (200 and 400 watts) ..... *
QUADRAM Microfazer Printer Buffer (P/P,P/S,S/P,S/S, 8K & up) . from $135
CURTIS System accessories ..... *
KENSINGTON Masterpiece System Console 129

DISKETTES

VERBATIM
Single sided/Single density: ..... 10/$24 100/$199
Double sided/Double density: ..... 10/$29 100/$249

DYSAN
Double sided/double density ..... 10/$29 100/$249
High-density AT diskettes ..... 10/$59

MAXELL
High-density AT diskettes ..... 10/$59

SOFTWARE

INTEGRATED AND RELATED PACKAGES
ENABLE(Reviewed as "the Package Symphony should have been") ... *
ASHTON-TATE Framework $345
LOTUS Symphony ..... *
SOFTWARE PUBLISHING Pfs Write, File, Graph, Report ..... from $79

WORD PROCESSING
SAMNA PLUS ..... *
MULTIMATE comes w/spelling checker and tutorial $259
MICROPRO WordStar 2000 & 2000 plus $245/295
MICROSOFT Word with/without Mouse ..... *
LIFETREE Volkswriter Deluxe w/Textmerge $169
SSI WordPerfect ..... *
SORCIM/IUS EasyWriter II System ..... *
LEADING EDGE Word Processor $65

SPREADSHEETS
LOTUS 1-2-3 ..... *
SORCIM/IUS Supercalc 3 ..... $195
MICROSOFT Multiplan w/templates $139

DATABASE MANAGERS
ASHTON-TATE dBase II & III $295/375
MICRORIM 4000 & 6000, w/Report Writer & Clout ..... *
GMS SYSTEMS Power-base $259
DAYFLO (Free-form database with opt Reportflo) ..... *
CIP Concentric Information Processor ..... *
MICROSTUF Infoscope ..... *
WARNER SOFTWARE The desk organizer ..... *
LEADING EDGE Nutshell $95

COMMUNICATIONS PACKAGES
MICROSTUF Crosstalk XVI $99
PERSOFT SmarTerm 100, 125, 400 ..... *
HAYES SmartCom II $95
SOURCE The Source ..... *
MENLO In Search ..... *
WESTERN UNION EASYLINK Mail Manager ..... *
DOW JONES All products ..... *

ACCOUNTING PACKAGES
SORCIM/IUS Complete accounting modules ..... from $289
BPI ACCOUNTING Complete accounting modules ..... *
REAL WORLD Accounting ..... *
OPEN SYSTEMS Accounting ..... *
SYSTEMS PLUS Books! accounting system ..... *
MONOGRAM Dollars and Sense w/Forecasting $139

GRAPHICS AND CAD PACKAGES
DECISION RESOURCES Signmaster/Chartmaster $179/249
BPS Business Graphics $259
MICROPRO ChartStar ..... *
AUTODESK AutoCAD with or without extensions ..... *
IMSI PC Paint Brush $95

PLANNING PACKAGES
MECA/TOBIAS Managing Your Money $129
ALPHA Electric Desk ..... *
HARVARD Harvard Project Manager ..... *
MICROSOFT Project .....

LANGUAGES & COMPILERS
BORLAND Turbo Pascal & Toolbox ..... ea $39
MICROSOFT All products ..... *
DIGITAL RESEARCH All products ..... *
WORDTECH dBASE COMPILER ..... *
LIFEBOAT Lattice C compiler and C-food Smorgasborg $299/*

UTILITY PROGRAMS
BORLAND Sidekick $39
BORLAND Superkey ..... *
FUNK SOFTWARE Sideways inverts printout $45
SOFTSTYLE Set FX + printer utilities $35
NORTON Utilities (by Peter Norton) $59
QUAID Copywrite, Disk Explorer & Zero Disk ..... *
CENTRAL POINT Copy II PC copies protected software $35
ATI Training (for many popular packages) $55

FOR ORDERS ONLY

* 1-800-446-7995

FOR FURTHER INFORMATION

* 1-404-446-7995

HRS: 9AM - 9PM EST, SAT & SUN 12N - 5PM EST.

IBM is a registered trademark of International Business Machines.

PROGRESSIVE MICRO DISTRIBUTORS

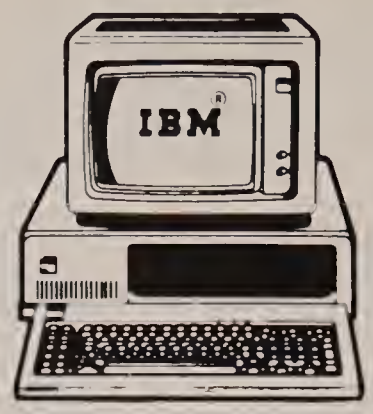
7000 Peachtree Industrial Boulevard
Norcross, Georgia 30071

Circle 68 on reader service card

IBM PC FLOPPY DISK SYSTEM
Basic system includes 256K, two floppy drives 360K each, drive controller and keyboard

IBM PC 10MB SYSTEM
Basic system includes 256K, one floppy drive, keyboard, 10MB Hard Disk with controller (boots from hard disk)

We have not given System prices due to continuous changes in the PC market and our policy of having the best prices and availability. Simply COMPARE our peripheral prices and for even greater savings **CALL FOR LATEST SYSTEM PRICES ...**



IBM PC 20MB SYSTEM
Basic system includes 256K, one floppy drive, keyboard, 20MB Hard Disk with controller (boots from hard disk)

IBM PC 30MB SYSTEM
Basic system includes 256K, one floppy drive, keyboard, 30MB Hard Disk with controller (boots from hard disk)

Choose from the widest selection of enhancement products for your IBM PC system at the best prices. Start with the Basic system and configure it according to your needs. All Hard Disk systems are available with 2 floppy drives. **All IBM Systems come only with COMPUMAIL's 90 day warranty.**

★ PRICE WAR ★ CALL US LAST WITH YOUR BEST QUOTES ★

PRINTERS

EPSON RX-80 $229 FX-80 + $389
RX-80FT + $279 FX-100 + $569
LQ-1500 Parallel $1099 Serial $1199
LQ-1500 Tractor/Cutsheet Feeder $50/$399
NEW JX-80 COLOR CALL

OKIDATA 92P/93P/84P $349/$559/$669
NEW OKIMATE 20 Color w/Plug & Print CALL
NEW 182P Personal Printer CALL

TOSHIBA 1340P $669
TOSHIBA 1351P $1199

JUKI 6100/6300 $379/$699

BROTHER HR-15 XL (20 CPS) $329
HR-25 (23 CPS) $549 HR-35 (36 CPS) $749
Tractor/Sheet Feeder for HR-25/35 $119/$199
M-1009 $199 2024L LQ/Graphics $999
2024L Cutsheet Feeders - Narrow $199 Wide $249

C. ITOH 8510-BPI $309 8510-SEP $379
8510-SCEP $439 1550-EP $429
1550-P $449 1550-SEP $529
F-10 (40 CPS) $859 F-10 (55 CPS) $1049

QUME LETTERPRO 20P $429 SPRINT 1140 + $1299
SPRINT 1155 + $1499 1190 + CALL
INTERFACE MODULES Centronics/Serial/IBM Par $80

NEC P-2 $649 P-3 $899
2050 $669 3550 $1299 8850 $1699

DIABLO 630 ECS/IBM $1799 630 API $1599
Advantage D-25 $549 620 API $729

DATA PRODUCTS
SPG 8051 (Same as IBM Color Printer) $1399
SPG 8071 (Same as 8051 at twice the speed) $1799

MONITORS

PGS MAX-12 Amber Monochrome (800x350) CALL
HX-12 (690x240) $429 SR-12 (690x480) $599
COLOR CARD for SR-12 (single slot) CALL

TAXAN COMPOSIT 115 Grn/116 Amber $139
MONO 121 Green/122 Amber (1000x360) $159
411 (510x260) $349 425 (640x262) $449
440 (720x400) $549 W/Persyst BoB Brd $969

AMDEK 300G/300A/310A (M) $139/$149/CALL
COLOR 600 (640x240) $429 710 (720x480) CALL

SAMSUNG Mono-Grn/Amber $129

QUADRAM AMBERCHROME (720x350) CALL
QUADCHROME II (640x240) Color Graphics & Text $429

EMULATION BOARDS

ORCHID's PCturbo 186 (128K to 640K) Best Prices
IRMA/IRMALine/IRMAPrint $859/$929/$929
IRMALette $299 IRMALine/IRMALette Package $999
CXI 3278/79 PLUS PC Connection Coax or Modem version
CXI 3270 PC Connection CALL

HARD DISKS/BACKUP

HARD DISKS/BACKUP for IBM PC
10 MB HD $599 20 MB HD $899
10 MB Tape Backup $599 Larger HD & Backups CALL

TALL GRASS NEW PC/T FORMAT
25 MB w/60 MB $2799 35 MB w/60 MB $3599
50 MB w/60 MB $4399 80 MB w/60 MB $5999
Controller $140 Cartridge(60 MB) $35

QUBIE 10/20 MB Internal or External CALL

KAMERMAN Mosterflight w/10, 20 or 30 MB HD and 10, 20 or 60 MB streamer tape backup w/controller cards, 5 plug power control, surge protection and lock.
Call for BEST price for your RIGHT combination.

MAYNARD 10MB/WS-1 $849 10MB/WS-2 $969
30MB/WS-1A $1999 30MB/WS-2A $2099
MoynStream - Complete cartridge backup system CALL

AMPEX PC Megastore 20MB w/25MB strmr CALL

SYSGEN 10MB tape backup $799
QIC File - 45MB tape backup - Int/Ext $1195/$1295
10 MB/20 MB Hard Disc w/streamer tape backup CALL

GENIE Fixed/Removable Systems Entire line

FLOPPY DISKS

TEAC Half Ht FD 55B - DSDD $109
CDC Full Ht/Half Ht - DSDD $139
IBM Full Ht - DSDD $159
TANDON 100-2 Full Ht/Half Ht-DSDD $119/$99

★ SUPER SPECIALS ★

64K RAM Set of 9 Chips $20
AST SIXPAK w/64K $245 Exp. to 384K $375
HAYES 1200B w/sft $369 1200 Ext $419
HARD DISK 10 MB/20 MB $599/$899
OKIDATA 92P $349 93P $559 84P $669
TOSHIBA 1340P $669 1351P $1199
ORCHID PCturbo 186 w/640K $1099
BROTHER HR-15 XL (20 CPS) $329
HR-25 (23 CPS) $549 HR-35 (36 CPS) $749
HERCULES MonoGraphics $299 Color $159
8087-3 Math Chip for IBM PC (Intel) $129
IBM's original PC Keyboard $129

COMPANY POLICY: Min order $100. Prices & availability subject to change. We ship UPS. Shipping/handling charges vary. COD requires cash, money order, cashier or certified check. Personal & Company checks take 3 weeks to clear. No refunds. 20% restocking fee on all returns, Compumail credit issued for balance. Call for return authorization #for repairs/returns. No open acct. PO's or foreign orders. For advance payment or PICKUP: Please call first for workorder number.

MasterCard VISA AMERICAN EXPRESS
NO SURCHARGE ON COD, VISA or MC AMEX 5%

MODEMS

MICROCOM ERA-2 Int. w/software $359
HAYES 1200 B Internal w/software $369
1200 Standalone w/o software $419
NEW 2400 Baud CALL
POPCOM C-100/X-100 Special Low Prices
PROMETHEUS PROMODEM 1200 Ext. $319
PROMODEM 1200B Internal w/software $275
NOVATION Access 123 Int. w/Crosstalk $399
NEW Smart Cat Plus w/MITE software - Int. or Ext. $349
VENTEL Half Card 1200 for short slot $419
QUBIE Standalone $309 Internal $279
BIZCOMP Intellimodems XL/XT/ST CALL

MULTI-DISPLAY CARDS

EVEREX Graphics Edge Best Price Ever
AST Monograph Plus w/clock, PP & Serial $399
PERSYST BoB Board $449
MYLEX Mono/Color Graphics & printer port $449
PARADISE Modular Brd $269 Modules CALL
INTELLIGENT B-450 Mono/Color/printer $249
TECMAR Graphics Master w/PC Paintbrush $449
HERCULES MonoGraphics $299 Color $159

MULTI-FUNCTION CARDS

AST SIXPAK w/64K $245 Exp. to 384K $375
QUADBOARD 0-K $219 Exp. to 384K $369
ORCHID Blossom 0-K $195 Exp. to 384K $345
BT 6 PLUS (like sixpak) w/64K $219 Exp. to 384K $349
IDS B-512 w/64K $219 Exp. to 512K $399

MISC. ADD ONS

8087-3 Math Chip for IBM PC (Intel.) $129
Floppy Drive Controller for IBM PC $119
CABLE Parallel $20 Serial $25
Keyboard Ext, 6 ft. $10 Smart Cable CALL
DISKETTES DSDD TOP BRAND Box of 10 $25
QUBIE Keyboard 5150 $119 5151 $149
KEYTRONIC Deluxe Keyboard KB 5151 $159
TOOL KIT 8 piece set in a convenient pack $29
TILT/SWIVEL Monitor Base $30
PC Keyboard Storage Drawer $89
KENSINGTON Master Piece (5 Outlets) $109
COMPUTER ACCESSORIES P2 (5) $109
POWER DIRECTOR P22 (4) $79 P12 (6) $149
STANDBY PWR SUPPLY w/surge protection
200 Watts $279 300 Watts $379 800 Watts CALL
KOALA Touch Tablet w/software $89

COMPUMAIL 805-498-6635

3541 OLD CONEJO ROAD, SUITE 102, THOUSAND OAKS, CA 91320

Ad #W796

COMPUTER MAIL ORDER

PRINTERS

BMC
BX-80 Dot Matrix.... $229.00

CITIZEN
MSP-10 (80 col)..... $349.00
MSP-15 (132 col)..... $539.00
MSP 20 (80 col)..... $569.00
MSP-25 (132 col.)..... $729.00

C.ITOH
Prowriter 8510P..... $299.00
F10-40P Starwriter..... $899.00
F10-55 Printmaster..... $1049.00

COMREX
ComWriterII Letter Quality..... $399.00

corona
Lazer LP-300..... $2799.00

DIABLO
36..... $1099.00
630 API Letter Quality..... $1549.00

daisywriter
2000..... $849.00

EPSON
RX-80, RX-100, LX-80..... CALL
FX-80+, FX-100+..... CALL
LO 1500, JX80 Color..... CALL
Homewriter 10..... CALL

JUKI
6100..... $399.00
6300..... $749.00

MANNESMANN TALLY
Spirit 80..... $229.00

NEC
2050 IBM..... $699.00
3550 IBM..... $1369.00
8830..... $1679.00
8850 IBM..... $1699.00
Pinwriters..... CALL

OKIDATA
82, 83, 84, 92, 93, 182,
2350, 2410..... CALL

OLYMPIA
Needlepoint Dot Matrix..... $339.00
Compact RO..... $399.00
Compact 2..... $439.00

Panasonic
KX1090..... $199.00
KX1091..... $279.00
KX1092..... $439.00
KX1093..... $619.00

QUADRAM
Quadjet..... $749.00

SILVER-REED
550 Letter Quality..... $429.00
770 Letter Quality..... $779.00

star
SG10 (120 cps)..... $239.00
SG15 (120 cps)..... $399.00
SR10 (200 cps)..... $499.00
SR15 (200 cps)..... $639.00
Powertype Letter Quality..... $329.00

TOSHIBA
1340 80 Column..... $599.00
1351 132 Column..... $1259.00

MULTIFUNCTION CARDS

AMDEK
MAI..... $249.00

AST
Six Pack Plus..... $239.00
Mega Plus II..... $269.00
I/O Plus II..... $139.00
Memory MBII..... $249.00
Advantage-AT..... $399.00
Preview Monograph..... $299.00
Graph Pak Mono/64K..... $599.00
MonoGraph Plus..... $399.00
5251/11..... CALL
5251/12..... $579.00
3780..... $639.00
BSC..... $499.00

dca
IRMA 3270..... $899.00
IRMA Print..... $999.00

EAGLE
Mono Card..... $149.00

EVEREX
Color Card (Graphics Edge)..... $299.00
Magic Card..... $199.00

HERCULES
Graphics..... $319.00
Color..... $169.00

IDEAssociates
IDEAmax - ZPR, 64K, C, S, P..$229.00
IDEAmini - YPR, C, S, P..... $189.00
IDEAminimax - MPR 128K..... $229.00
IDEAshare Software..... $219.00
IDEA 5251..... $699.00

PARADISE
Modular Graphics Card..... $279.00
Multi Display Card..... $299.00
Five Pack C, S..... $159.00

PLANTRONICS
Color Plus..... $369.00

TECMAR
Captain - 64..... $239.00
Captain Jr. 128K..... $339.00
Graphics Master..... $469.00

QUADRAM
Quadboard II..... $229.00
Expanded Quadboard..... $239.00
Quad 512+..... $249.00
Quad 2 Meg..... $879.00
Memory Board..... $229.00
QuadJr Exp. Chassis..... $499.00
QuadJr Exp. Memory..... $219.00
QuadMemJr..... $229.00
Chronograph..... $89.99
Parallel Card..... $69.99
Quadcolor I..... $219.00
Quadgraph..... $379.00

GUARANTEED BEST PRICE ON ALL PC SOFTWARE!!

PC COMPATABLES

IBM PC SYSTEMS

Configured to your specifications.

Call for Best Price!

PC Compatibles from: Columbia Data, Sanyo, Eagle, Zenith, and Corona

SPECIAL

THIS MONTH'S SPECIAL!

CompuServe Starter Kit

$24.99

MONITORS

AMDEK
300 Green..... $129.00
300 Amber..... $139.00
310 Amber IBM-Plug..... $169.00
300 Color/Audio..... $239.00
Color 500 Composite/RGB..... $389.00
Color 600 Hi-Res (640x240)..... $439.00
Color 700 Hi-Res (720x240)..... $499.00
Color 710 Long Phosphor..... $579.00

BMC
9191U Color..... $179.00

NAP
12" Amber..... $69.99
12" Amber/Green TTL.....(ea.) $119.00

NEC
JB 1260 Green..... $99.99
JB 1201 Green..... $139.00
JB 1205 Amber..... $139.00
JB 1215 Color..... $229.00
JC 1216 RGB..... $379.00
JC 1460 Color..... $269.00
JC 1410 RGB..... $669.00

PRINCETON
MAX-12 Amber..... $189.00
HX-12 RGB..... $469.00
SR-12 RGB..... $629.00

TAXAN
121 Green TTL..... $139.00
122 Amber TTL..... $149.00
210 Color RGB..... $239.00
400 Med-Res RGB..... $299.00
415 Hi-Res RGB..... $439.00
420 Hi-Res RGB (IBM)..... $429.00
440 Ultra Hi-Res RGB..... $589.00

QUADRAM
8400 Quadchrome..... $479.00
8410 Quadchrome II..... $469.00
8420 Amberchrome..... $179.00

ZENITH
ZVM 122 Amber..... $89.99
ZVM 123 Green..... $89.99
ZVM 124 IBM Amber..... $149.00
ZVM 131 Color..... $299.00
ZVM 133 RGB..... $429.00
ZVM 135 RGB/Color..... $459.00
ZVM 136 RGB/Color..... $599.00

ORDER LINE

1-800-233-8950
In PA 1-800-242-4215

CUSTOMER SERVICE AND TECH SUPPORT
1-717-327-1450

MAILING ADDRESS

EAST
Dept. B205, 477 E. Third St.
Williamsport, PA 17701

WEST
Dept. B205, P.O. Box 6689
Stateline, NV 8944

MEMBER DIRECT MARKETING ASSOCIATION

CREDIT CARDS

VISA · MasterCard · AMERICAN EXPRESS · DINERS CLUB

SHIPPING

Add 3%, minimum $5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
Ontario/Quebec

1-800-268-4559
Other Provinces

1-416-828-0866
In Toronto

TELEX: 06-218960

2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

All prices shown are for U.S.A. orders.
Call The Canadian Office for Canadian prices.

DRIVES

ALLOY..... CALL
EVEREX..... CALL
IDEASSOCIATES..... CALL
IOMEGA..... CALL
RANA..... CALL
TALLGRASS..... CALL
TANDON TM-100L..... $129.00

MODEMS

ANCHOR
Volksmodem XII..... $189.99
Mark VII (Auto Ans/Auto Dial)..... $99.99
Mark XII (1200 Baud)..... $259.00

Novation
Smart Cat Plus..... $319.00
J-Cat..... $99.99
Smart Cat 103..... $179.00
Smart Cat 103/212..... $399.00

Hayes
Smartmodem 300..... $199.00
Smartmodem 1200..... $389.00
Smartmodem 1200B..... $359.00
Smartmodem 2400..... $699.00
Smart Com II..... $89.99
Chronograph..... $199.00

AST
Reach 1200 Baud Half Card..... $399.00

CALL TOLL-FREE 1-800-233-8950

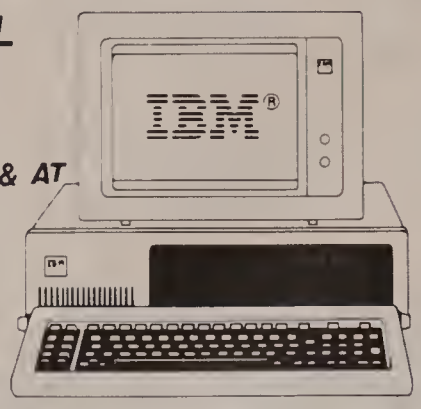
Circle 420 on reader service card

COMPUTER HUT™

COMPARE OUR SERVICE & PRICE!

SPECIAL OF THE MONTH

IBM-PC, XT & AT CALL FOR PRICE



COMPAQ® ..... CALL

DISK DRIVES

Tandon TM100-2 DS/DD $159
MATSUSHITA JA 551 $139
TEAC FD-55B Slimline $139

HARD DISKS/TAPE

MAYNARD
WSI ..... $849 WS2 ..... $1049

IOMEGA
Bernoulli Box 20 Meg $2695
EVEREX, SYSGEN CALL

ME MAYNARD ELECTRONICS
Floppy Disk Controller $129
FDC w/Par. Port or Ser Port $179/189

ADD-ON BOARDS

QUADRAM
Quadboard 64K exp. to 384K ... $269
Quadcolor I & II ..... CALL
Quad 512+ 64K $239

AST RESEARCH
SixPak Plus 64K $269
MegaPlus II 64K $279
I/OPlus II $129
Advantage ..... CALL

MICROLOG
Baby Blue II 64K $489

TECMAR
Graphics Master $489
MAESTRO ..... CALL

HERCULES
Hi Res Mono Graphics $335
Color Graphics w/Par Port $189

PARADISE
Modular Graphics $285
5-PACK ..... CALL

MODEMS

Hayes
Smartmodem 1200 ..... $429
Smartmodem 1200B $389
Smartmodem 2400 ..... $649

BIZCOMP
PC Intellimodem $359

NOVATION ..... CALL
SmartCat $349

PRINTERS

EPSON
FX-80+ ... FX-100+ ...
RX-80 ..... BEST RX-100 .... BEST
JX-80 ..... DEAL LQ-1500 ... DEAL
LX80 .....

brother
HR-15 XL $399
HR 35 ..... $839

DYNAX/FORTS
DX-15 Par $399
DM40 NLQ ..... CALL

C-ITOH
PROWRITER CALL
STARWRITER F-10P $995

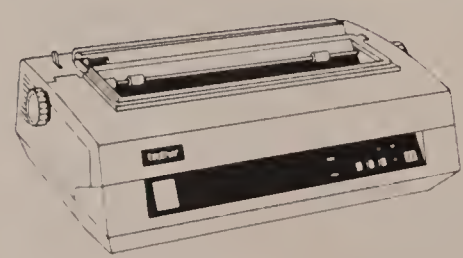
OKIDATA
182P .....
84P ..... BEST 84S ..... BEST
92P .... PRICES 92S ..... PRICES
93P .... 93S ....

NEC
Spinwriter 2050 ..... $699
3550 ..... $1449 8850 ..... $1949
Pinwriter P2 $589 P3 ..... $795

TOSHIBA
P1351 .... $1299 P1340 ..... $649

DAISYWRITER
2000 w/48K Buffer $849

DATAPRODUCTS ..... CALL

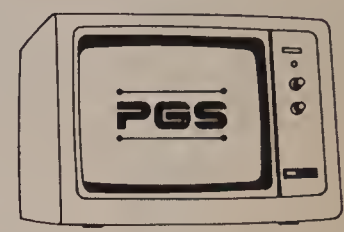


ASK ABOUT OUR TRAINING & REPAIR SERVICES.

MONITORS

AMDEK
Video 300G ... $135 300A ... $145
Video 310A $179

PGS
HX12 Hi Res RGB monitor ..... BEST
MAX-12 Hi Res Mono. PRICES
SR-12 Super Hi Res RGB



SOFTWARE

WORDPROCESSING
MS Word $239 Multimate $269
Volkswriter Deluxe $159
PFS: Write $89 PFS: Proof $69
WordPerfect $269 WordStar CALL

DATABASE/INTEGRATED
dBase III CALL Quickcode III $179
RBase 4000 $279 Clout 2.0 $169
LOTUS 1-2-3 & Symphony ..... CALL
Framework CALL

UTILITIES/COMPILERS
Crosstalk $109 Smartcom II $109
Sideways $49 Norton Utilities $59
Sidekick $45 Turbo Pascal $45
LIFEBOAT Lattice C $299
MS Basic $259 MS Fortran $239

BUSINESS
MICROSOFT Project $159 Chart $159
STAR Acct. Partner I & II CALL
BPI SYSTEMS ..... CALL
PFS: File $89 PFS: Graph $89
PFS: Plan $89 Multiplan $139

OTHER
Mastertype $35 Typing Tutor III $39
Math Blaster $39
Flight Simulator $39
Managing your money $135

AND LOTS MORE

ANY PRODUCT NOT LISTED? CALL

EAST COAST

COMPUTER HUT
OF NEW ENGLAND INC.
101 Elm St. Nashua, NH 03060
(603) 889-0666
For Orders Only — (800) 525 5012

CANADA

MICROCONTEXT
AUTHORIZED DEALER
4847 Ave Du Parc
Montreal Que H2V4E7.
(514) 279-4595

MID-WEST

COMPUTER HUT INC.
524 S. Hunter
Wichita, Kansas 67207
(316) 681-2111
For Orders Only — (800) 572 3333

All products usually in stock for immediate shipment and carry full manufacturers' warranty. Price subject to change — this ad prepared two months in advance. You get the lowest price. We honor personal checks — allow 10 days to clear. COD up to $300 add 2%. Visa, MasterCard add 2%. For shipping & insurance add 2% or $6.00 min. for small items and $12. min. for monitors, printers, etc. We accept company checks and P.O.'s from Fortune 1000 Companies.

IBM is a trademark of IBM Corp.

Return authorization and order status call information line

Circle 158 on reader service card

TOLL FREE 1-800-545-2633

NO SALES TAX FOR OUT-OF-STATE CUSTOMERS

IBM SPECIALIST - FULL SERVICE ON HARDWARE

IBM PC-3 SYSTEM
256K Ram/2 ea 360K F D
(Your choice Standard or 1/2 HGT)
IBM Mono CD · Monitor
$2059

IBM PC-10 HARD DISK SYSTEM
256K Ram/1 ea 360K F D
10 MG H D · Keyboard
(3 Times faster than XT)
$2569

IBM AT HARD DISK SYSTEMS
512K Ram/1 2 MEG F D
$5700
20 MEG H.D. w/360K FD
$5900

MEMORY UPGRADES
PC (64K) With Parity ... $19.95/9 ea
AT With Parity (128K) $99.00/9
Compaq (256K) With Parity $149/9 ea

PRINTERS

C. Itoh 8510A (120 CPS) ... $309
Daisywriter 2000 (48K Buffer, 20 to 40 CPS Ltr Qual $909
Diablo D-25 (25 CPS) $579
Diablo 630 API (40 CPS) .. $1549
Diablo 630 ECS/IBM $1649
Epson FX-80+ (160 CPS) .. $399
Epson FX-100+ (160 CPS) $589
Juki 6100 (18 CPS) $439
Juki 6300 (40 CPS - 16") ... $799
Okidata 82a (120 CPS) $319
Okidata 83a (120 CPS) $569
Okidata 92a (160 CPS) $359
Okidata 93a (160 CPS) $589
Okidata 84p (20 CPS - 15") ... $729
Okidata 84s (200 CPS - 15") .. $849
Okidata 2350P $1895
Okidata 2410P $1895
Panasonic 1091 (120 CPS) - Par Port - Double Strike Switch $299
Panasonic 1092 (160 CPS) & all functions of 1091 .... $439
Toshiba P-1351 (192 CPS/120 CPS Ltr) $1299
Toshiba P-1340 (144 CPS/54 CPS Ltr) $695
Call for Printer Accessories

PRINTER SWITCHES

Allows you to switch from letter to Dot Matrix by flip of switch
SCN-2/Two Position Centronics Par to Centronics Par $85
SCN-4/Four Position Cen Par to Cen Par $125
SRS-2/Two Position Serial to Serial $77
SRS-4/Four Position Serial to Serial $115

CABLES

IBM to Par Cable $16
Centronics to Centronics $20
RS232 Serial (Specify) $16
Columbia to Par $28
IBM Add-on Drive (DC37 Conn) $34
Disk Drive Cable 5" or 8" $26
Y-Splitter Cable $7.95
Macintosh Serial Cable ... $19.99
Macintosh Modem Cable $19.99

MEMORY BOARD

AST 6 Pak+ w/64K (Expands to 384K) has Par, Serial, Clk, RAM Disk, Spooler $249
AST 6 Pak+ w/384K $419
QUADBOARD 384 w/64K (Expands to 384K) has Par, Serial, Clk, RAM Disk, Spooler, Game Port $259
QUADBOARD 384 w/384K ... $429
TECMAR CAPTAIN w/64K (all features of 6 Pak) $229
TECMAR CAPTAIN w/384K $379

DISK DRIVES

	1	2	10
CDC 9409 DS/DD 360K	149	145	140
MIT M-4853 1/2 HGT	169	159	140
SA455L	120	112	102
TANDON TM100-1A	119	115	109
TM100-2A DS/DD 360K 5" Full Size	149	145	140
TEAC FD55B DS/DD 360K 1/2 HGT	129	120	110
TEAC FD55F Quad 720K 1/2 HGT	135	129	126

DISK DRIVE CABINETS

8" CABINETS
III DTL-002 Holds 2 ea 8" Thinline w/P S $169
III FDE-002 w/ ea 8" STD Size, Horizontally w/P S $189
QTC DDC88V28 Holds 2 ea 8" Std Size/ Vert. $289

5 ¼" CABINETS
III HD 5-001 w/P S for 1 Thinline Hard Disk $189
III HD 5-002 w/P.S for 2 Full Size Hard Disk or Tape ... $249
DDC5H w/P S Horiz for 1 ea Std Size $55
DDC5V 1/P S Vert for 1 ea Std Size $55
DDC55V w/ P S Vert for 2 ea Std Size $85

SLIMLINE 5 ¼" CABINET
DDC55H 1/2 w/P S Horiz for 2 ea 1/2 HGT $75
DDC55V 1/2 w/P S Vert. for 2 ea Drives $75

IBM SYSTEMS

IBM PC-1 Includes 64K RAM, 1 ea 360K FD, KB $1449
IBM PC-2 64K RAM, 2 ea 360K FD, KB $1519
IBM PC-22 256K RAM, 2 ea 360K FD, KB $1599
IBM PC-3 256K RAM, 2 ea 360K FD, IBM Mono Card & Display, KB $2059
IBM PC-33 256K RAM, 2 ea 360K FD, Video Bd Monitor, KB $2049
IBM PC-4 256K, 2 ea 360K FD, Everex Graphics Edge, Ouimax PX4 KB $2499

IBM HARD DISK DRIVES

IBM XT 128K RAM, 10 MG, Hard Disk, 1 ea 360K FD & keyboard $3495
PC-10 256K RAM, 10 MG HD (3 times faster than XT) 1 ea 360K FD, and Keyboard $2569
PC-10/2 256K RAM, 10MG HD (3 times faster than XT) 2 ea 1/2 Hgt., 360K FD and Keyboard $2729
PC-10/2M 256K RAM, 10 MG HD (3 times faster than XT) 2 ea 360K FD, Ouimax DM14A, IBM Monocard, Keyboard $2999

IBM MISCELLANEOUS

P.C. Ware Serial Board $79
P.C. Ware Par Board $75
P.C. Ware Clock Calendar $59
P.C. Ware "256K RAM"/0K ... $129
P.C. Ware "256K RAM"/64K ... $159
IBM DOS 2 1 ..... $57
IBM DOS 3 0 ..... $60
LOTUS 1-2-3 ..... $299
FDC (Controls up to 4 ea 5" Floppy Cont. $79
MAYNARD "Sandstar" FDC - controls 5 and 8" $219
EVEREX H D Controller $289
ADAPTEC - *Controls any Winchester Tech HD
* 2-1 Interleave/3 times faster than XT $269
KD 5151 Keyboard $199
IBM Keyboard $119

IBM-AT SYSTEMS

3 TIMES SPEED OF XT
IBM-AT (Enhanced) includes 512K RAM, 1 2 MB FD, 20 MG Fixed Drive, 8 slots Keylock, KB $5700

AT ADD-ON DRIVES

20MG Hard Disk $999
40MG Hard Disk $1499
1 2 MG F D w/Rails $329
360K F D w/Rails $229
IBM-AT Rail Set $9

AT MEMORY BOARDS

***STB "Rio-Grande"** 128K/Exp to 1 5 MG $359
***STB "Grande Byte"** 128K/Exp to 2 MG $299
AST ADVANTAGE w/128K expandable to 3.0 MG $499
AST ADVANTAGE w/512K expandable to 3 0 MG $849

MODEMS

ANCHOR MARK XII - External $229
HAYES 1200 - External $399
HAYES 1200B - Internal for IBM with Software $389
POPCOM C-100 - Internal .. $299
POPCOM X100 - External/1200. ..... ONLY $319
PRO-MODEM 1200 External $329
PRO-MODEM 1200A - For Apple Computers $339

HARD DISK SUB-SYSTEMS

- With Controller & Cables
- 3 Times Faster XT

	INT	EXT
10 MG	$629	$849
20 MG	$999	$1249
40 MG	$1799	$2049

HARD DISKS

WHILE THEY LAST
10 MG $389
20 MG $499

MONITORS

IBM Color Display $569
IBM Monochrome Monitor $219
Amdek 300A $149
Amdek 310A $169
QUIMAX DM 14A (Amber) 14" Screen $169
QUIMAX DM14G (Green) ... $159
QUIMAX PX-IV (4) - Hi Res RGB w/Switch to convert to green for Word Processing w/Tilt & Swivel Base $449
(Better than Princeton HX-12)

VIDEO CARDS

IBM Monochrome w/Par ... $199
HERCULES Graphics Card $329
IBM Color Graphics $219
EVEREX "Graphics Edge" - Runs Mono & RGB Color at the same time (640x200), 16 Color/Hi-Res/Par Port 80x25 or 132x44 ..... $369
HERCULES Color $169
PARADISE "Multi-Display" .. $319
PARADISE "Modular Card" . $345
Modular A $88
Modular B $240

TAPE BACKUP UNIT

* 10 MB Streamer Tape back-up
* Back-up in 8 min
Internal Steramer 1/2 HGT $549
External Streamer (w/Power Supply and case) 1/2 HGT ... $649
10 38 MG Tape Cartridge . $29

SYSTEMS

Compaq Portable - 256K/2 ea 360K F D $2295
Compaq Desk Monitor Pro 2 - 256K/2 ea 360K F D ___ $2295
Columbia 1600-1 ..... $1995
SANYO MBC 55-2 w/Software $1079
SANYO Drive Upgrade (720K) w/Software $399
SANYO Serial Port $65
SANYO 128K Memory Upgrade $69
SANYO RGB Monitor 13" (480x240) Cable $289
SANYO Video Bd $169
Allows Use of IBM Sottware & any RGB Monitor

TEAC FD55B
DS/DD 360K
$129 ea. 2 for **$120** ea

10 MEG EXTERNAL HARD DISK TAPE BACKUP/Controller
Power supply and case
$1299

AST 6 PAK PLUS
Par Port/Serial Port/Clock
Ram Disk · Spooler
64K . $249 364K .. $419

U.S. ROBOTICS PASSWORD MODEM
300/1200 Baud External
$229

QUIMAX PX-4
RGB Monitor w/Green Screen 720x240
Better than Princeton
$449

SHUGART SA455L
DS/DD 360K
$120 ea 2 for **$112** ea

10 MEG INTERNAL HARD DISK
With Controller and Cables for IBM
$629

QUADRAM 384
Par Port/Serial Port/Clock
Game Port/Ram Disk · Spl
64K .. $259 364K $429

HAYES MODEM
1200 External $399
1200 B Internal $389

IBM MONOCHROME
MONITOR $219
VIDEO BD $199

TANDON TM 100-2A OR CDC 9409
DS/DD 360K
$149

40 MEG CMI HARD DISK FOR IBM-AT
$1499

TECMAR CAPTAIN
Par Port/Serial Port/Clock
Ram Disk · Spooler
64K .. $229 364K . $379

MATH CO-PROCESSOR
8087 $139
8087-2 $229

TOSHIBA P-1340 PRINTER
144 CPS/54CPS
Ltr Quality
$695

TERMS We accept MC, Visa (3% handling charge on AMEX only), Wire transfer and Purchase Orders from qualified firms All returns without RMA are subject to 20% restocking charge Utah residents pay 5 75% sales tax Call for freight charges Prices subject to change and are in U S Currency only MINIMUM ORDER $15 00 P O prices are slightly higher

MasterCard

Customer Service (801) 972-2739
Sales (Utah) (801) 972-2717
Sales (Outside Utah) (800) 545-2633

The Great Salt Lake Computer Company, Inc.

SEND FOR NEW CATALOG

VISA

Retail and Mail Orders
1780 West 2300 South
Salt Lake City, Utah 84119
Prices subject to change without notice.

Circle 978 on reader service card

NEW COMPUTER PRODUCTS & PRODUCTIVITY TOOLS

ULTRA PAK™

The one board that does it all for your PC:
• Lotus 1-2-3 • Graphics • 132 Column Spreadsheet • User-Expandable Memory
• Disk Controller and much more.

$550

- PURCHASING
- MANAGERS
- Phone
- Bob Hamirani
- Corporate
- Sales
- Manager

The SOFTEASE Family of Products

Productivity Software for Customized Solutions

The SOFTEASE Family of Products includes
• DATA EASE • WORD EASE
• GRAPHEASE • DOSEASE

Now You Can Customize To Your Specific Needs

No Mail Order

PROFESSIONAL DESK ORGANIZER PROGRAMS

Increase your office efficiency with the latest in desk organizations

- SPOTLIGHT
- DESK ORGANIZER
- SIDEKICK
- MYDESK

COMPAQ™ COMPUTERS

COMPAQ PORTABLE
2DD, 256K, DOS 2.1

$2,099

Call for DeskPro Prices

apple computer

APPLE MacIntosh

$1,849

Includes 128K, 2DD, monitor, McWrite & McPaint

CYMA PROFESSIONAL APPLICATION PACKAGES

No mail order

Designed to Automate your Accounting and day to day tasks
• Medical • Dental • Orthodontic
• Shoebox Account • Accounting • Manufacturing

SOFTWARE

Framework	$345
Enable	$295
Lotus 1-2-3	$295
Lotus Symphony	$399
dBase III	$345
Multiplan (IBM/MAC)	$135
Word Perfect (4.0)	$265
Multimate (3.3)	$275
PFS Series	$79/Ea
Knowledgeman (1.07)	$275

RETAIL OUTLETS

Pick 'N Pay Software
San Jose, CA
Telephone (408) 293-3360
Phoenix, AZ
Telephone (602) 285-1700

TERMS: All prices subject to change without notice. Payment by cashier's check/MO/bank transfer. Please allow approximately one week shipping delay for clearance of personal or company checks. California residents add sales tax. For non-cash sales, please add 3% handling charge.
SHIPPING: Add $5 per item for UPS Surface, $10 for UPS Blue Label. For Monitors add $20 and Printers $25 for shipment within continental U.S.A.

HARDWARE

Printers (Epson, Okidata, Toshiba, NEC)	Call
Hercules Monochrome/Color	$305/$165
AST 6-Pak (64K)	$255
M.A. Systems Pro Kit for PC Juniors	Call
Plantronics Color	$389
Irma Card	$895
Miniscribe 10MB Drive w/DTC Controller Card	$695
Bernuli Box 20 MB	$2,495
PC Net	$345

MC-P APPLICATIONS

—ORDER DESK ONLY—
(800) 292-3360
TOLL FREE OUTSIDE CALIF.

1630 Oakland Rd., Suite A114, San Jose, CA 95131
(408) 293-3360

—ORDER DESK ONLY—
(800) 272-3360
TOLL FREE IN CALIFORNIA

Circle 793 on reader service card

I*U*CO is the best thing to happen to personal computing since the personal computer.

I*U*CO is an idea whose time has come.

I*U*CO is the International Union of Computer Owners, an organization designed to protect the interests of computer owners and users against those who would take their money...and then deliver less than they promised.

Here's an overview of some of the vital services I*U*CO provides:

1. Access to the lowest priced, reputable vendor for nearly every computer related need; and,
2. Protection from the rip-off artists, vaporware specialists, false advertisers and other creepy, crawly creatures who have been attracted to the computer industry by the scent of your money; and,
3. Constantly updated information on software and hardware releases, bug reports, fixes and other data individually tailored to your needs through I*U*CO's exclusive Computer Registry; and,
4. Finally, a chance to get even with those characters out there who promise a lot, take your money and then deliver less than they promised.

I*U*CO: a lynch mob with a purpose.

Every computer owner has been ripped off at least once.

Or maybe a dozen times might be a more appropriate number

In any event, we've all been victimized by the computer industry

And it wasn't accidental: today's computer industry is filled with hypesters, rip-off artists, vaporware specialists and others whose sole function in life is to part you from your money while delivering less than you bargained for.

The rip-off might have been a computer that wasn't quite as "compatible" as claimed. Or a computer that didn't quite get delivered at the same time as the "hundreds" of new programs that would support it.

Or it might have been a software package that didn't quite live up to its advertising hype. Possibly, you've been had by a software manufacturer who continuously upgrades their software...charging you a pretty penny for an updated version that simply gets rid of the bugs that shouldn't have been there in the first place.

In a few cases, it might even have been a vendor who took your money...and never quite got around to delivering what you paid for

In any event, owning a computer has been an open invitation to getting ripped-off in one way or another.

Until now

I*U*CO means protection.

I*U*CO subscribes to some very ancient wisdom: in numbers, there is strength.

Labor unions learned it a long time ago.

An individual worker had no bargaining power. All the workers in a factory, however, have a lot of muscle.

Automobile owners learned it early on. The American Automobile Association was originally organized to bring motorists together in order to lobby for new roads and highways.

Even the computer industry has learned it: computer manufacturers, software publishers and others in the industry have now banded together in order to get legislative approval for their meaningless "disclaimers" and to restrict your right to copy the software you've purchased

I*U*CO is designed to be what every collective organization is: a means to protect the special interests of its members.

And, in this case, the members are the victims...the people who own and use personal computers.

The people who, until now, have been powerless.

First of all, I*U*CO means low prices.

The first benefit an I*U*CO member gets is the opportunity to save money

Lots of it.

I*U*CO maintains a database of every mail-order advertisement that appears in the major computer magazines.

When you want the lowest price on something, just (electronically) mail your shopping list to I*U*CO.

Within a day, you'll get the three lowest and most recently quoted prices...and, quite possibly, some still lower prices that haven't been published at all.

I*U*CO protects you.

Of course, buying mail order can get you more than low prices.

It can also get you a lot of problems in delivery

So, along with the low price quotation, you also get I*U*CO member evaluations and reports about the vendor...and, to make sure that you'll be happy with the product, a bibliography of reviews, articles and letters to the editor about the product or service you want to buy!

In short, as an I*U*CO member, you not only find the lowest price...but you might also find out that you don't really want to spend the money in the first place!

These are the first steps in I*U*CO's program:

1. Getting you the lowest possible prices.
2. Giving you an assessment of the potential vendor.
3. Providing information on the actual use value of the product. *(An awful lot of products sound better in their advertising than they are in reality. That's why so few companies offer a money-back guaranty.)*

Continuing protection from I*U*CO: the Computer Registry.

As an I*U*CO member, you can become part of our exclusive Computer Registry

You simply register the appropriate information about all the hardware, software and peripherals you own with I*U*CO.

Then, as updates are announced, problems are discovered, fixes released and so on, you automatically get this information.

No more finding out a year after the fact that the current version of your program is 3.14...not the Version 1.7 program you've been using Likewise, you might find out that the mysterious system error messages you've been getting aren't just your problem, but rather wide spread.

(As a personal note, this I*U*CO service is invaluable.

In the early days of personal computers, hardware, software and peripheral manufacturers used to be pretty good about sharing information.

Today, they're not.

In the last few weeks, I personally have learned: a) my MacIntosh 512K Upgrade is defective and won't work with MacPaint under certain circumstances; b) the ROMS in my Anadex printer have been upgraded, c) the ROMS in my IOMEGA Bernoulli box have been upgraded; d) MicroPro eliminated the copy protection on my version of Wordstar 2000 Plus; e) MicroPro had a bug in InfoStar for more than 18 months...and didn't tell anyone.

I*U*CO membership would have avoided these unpleasant surprises.)

With I*U*CO, you get the information you need on an individualized basis...and you get it fast.

You don't have to tear your hair out wondering about a problem. You might even find out about the problem before you encounter it!

I*U*CO: the iron fist.

The best part of I*U*CO has been saved for last.

Yes, I*U*CO will get you lower prices and will give you solid information about the integrity and usefulness of products and vendors.

But, more importantly, your membership in I*U*CO gives you the power of belonging to a community .a community of computer owners and users who need to protect their rights.

For instance, a group of software publishers recently managed to get the Louisiana legislature to pass a law "legalizing" the non-warranties they provide with their software. (You know, "this software is sold without any representations that it will work".)

I*U*CO will fight that kind of nonsense by lobbying against it.

Likewise, when a company...even a major company...announces vaporware, I*U*CO will use the same tools to fight back...to prevent publishers and dealers from getting us all aglow about a new machine or a new piece of software that won't be delivered for months. (For instance, how many people would have bought the MacIntosh a year ago had they known that the "hundreds" of programs to be "shortly available" simply didn't exist?)

Finally, when the situation demands it, I*U*CO will be ready to sue. For example, what do you do in a situation where you run out and buy Wordstar 2000 Plus...only to find out later that its files are not compatible with the original Wordstar? (If you read the advertising, it doesn't say a word about it. You find out after you've laid your dollars on the table!)

There's a lot more to the I*U*CO story.

The whole story of I*U*CO and its benefits takes eight pages to tell. Ads...especially those that tell the truth...are expensive, so we can't take eight pages in this magazine to tell the whole story

But, if you send us a buck, we'll send you the entire I*U*CO information and enrollment package.

You can make up your own mind whether it's a dollar well spent or not.

International Union Of Computer Owners, Inc.
Suite 4806
30 East Huron Street
Chicago, Illinois 60611

YES, I'm tired of being ripped off. Enclosed is $1.00. Please send me the information and enrollment package for I*U*CO, the International Union of Computer Owners.

I understand that I am under no obligation to enroll.

**** PLEASE PRINT ALL INFORMATION ****

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

MAKE OF COMPUTER _____

I*U*CO International Union of Computer Owners, Inc.

Suite 4806
30 East Huron Street
Chicago, Illinois 60611

Circle 780 on reader service card

RETURNABLE SOFTWARE FOR THE IBM-PC®

(AND AT 20% TO 50% OFF MANUFACTURERS' LIST)

Eliminate the risk of buying software that doesn't meet your needs.

With Computer Inventory Control, you eliminate the risk of buying software that doesn't meet your needs. Buy any of the most popular IBM-PC® software programs at our discount prices of 20% to 50% off manufacturers' list. If it doesn't meet your needs, return it within 15 days for a refund of your purchase price less a restocking fee of only 20% of the manufacturer's list price.

BELOW IS A SAMPLE OF OUR EVERYDAY DISCOUNT PRICING.
COMPARABLE SAVINGS ON HUNDREDS OF OTHER ITEMS ARE LISTED IN OUR FREE CATALOG.

	LIST	DISCOUNT PRICE	RESTOCK FEE
WORD PROCESSING			
WordStar 2000 (NEW)	$495	**$269**	$ 99
MicroSoft WORD	375	**239**	75
MultiMate	495	**259**	99
Volkswriter Deluxe	285	**159**	57
Volkswriter Scientific	495	**349**	99
Word Plus-PC	395	**275**	79
Word Perfect 4 0 (NEW)	495	**249**	99
WordStar	375	**198**	75
WordStar (jr.)	195	**139**	39
WordStar Propak	495	**259**	99
Samna III	550	**349**	110
DATABASE			
Knowledgeman 1 07	500	**269**	100
R BASE 4000	495	**269**	99
R BASE Clout 2	245	**149**	49
R Graph	295	**159**	59
dBASE II	495	**279**	99
dB Compiler	750	**599**	150
Quick Report	295	**159**	59
dBASE III	700	**359**	140
dBASE III Upgrade	200	**129**	
Quickcode III	295	**149**	59
PFS Report	125	**89**	25
PROJECT MANAGEMENT			
Harvard Proj Mgr	395	**219**	79
Harvard Total Proj Mgr	495	**299**	99
MicroSoft Project	250	**159**	50
SuperProject (Sorcim)	395	**249**	79
GRAPHICS			
Chart-Master	395	**249**	79
Sign-Master	245	**179**	49
ChartStar	395	**225**	79
PFS Graph	140	**99**	28
MicroSoft Chart	250	**169**	50
DR HALO (Lifeboat)	100	**79**	20

	LIST	DISCOUNT PRICE	RESTOCK FEE
BUSINESS ACCOUNTING			
BPI Systems	$595	**$369**	$119
IUS Business Acct	595	**299**	119
Open Systems	695	**399**	139
Real Word/MBSI	695	**399**	139
In House Accountant	180	**129**	38
UTILITIES			
Spotlight (Software Arts)	150	**99**	30
Norton Util. 3 0 (NEW)	100	**59**	20
PROKEY 3.0	130	**79**	26
Sidekick (Borland)	85	**59**	17
COMMUNICATIONS			
Crosstalk XVI	195	**109**	39
Remote	195	**139**	39
PFS.Access	95	**76**	19
SPREADSHEETS/INTEGRATED			
Lotus 1-2-3	495	**293**	99
Lotus 1-2-3 (jr)	495	**319**	99
FRAMEWORK	700	**359**	140
Open Access (NEW)	695	**399**	139
SuperCalc³	395	**198**	79
Electric Desk	345	**219**	69
Electric Desk (jr)	295	**199**	59
Symphony	700	**419**	140
DESQ	399	**299**	80
ENABLE	699	**299**	140
PERSONAL ACCOUNTING/FINANCE			
Home Accountant +	150	**79**	30
Managing Your Money	199	**119**	40
Dollar & $ense w/Fore	180	**129**	36
Desk Organizer	195	**129**	39
OTHER SOFTWARE			
SPSS/PC (XT Req'd)	795	**636**	159
Think-Tank	195	**119**	39
Property Mgr (Cont)	495	**319**	99
Management Edge	250	**169**	50
Cdex Training	70	**47**	15

	LIST	DISCOUNT PRICE	RESTOCK FEE
COMPILERS/LANGUAGES			
BASIC (MicroSoft)	$395	**$259**	$ 79
BASIC Cartridge (jr)	75	**64**	15
Morgan Prof. BASIC/8087	149	**99**	30
Cobol (MicroSoft)	700	**459**	, 140
FORTRAN (MicroSoft)	350	**239**	70
PASCAL (MicroSoft)	350	**229**	70
Turbo Pascal (Borland)	55	**39**	11
Macro Assembler 1 27	100	**69**	20
Macro Assembler 3 0	150	**109**	30
C PROGRAMING			
Lattice C (Lifeboat)	500	**299**	100
C Compiler (MicroSoft)	500	**319**	100
RUN/C Interpreter	150	**109**	30
Greenleaf Functions	175	**139**	35
HALO (Lifeboat)	200	**149**	40
C Food Smorgasbord	150	**109**	30
Lattice C Sprite	175	**129**	35
Lattice dB-C	250	**199**	50
C POWER PACKS (Software Horizons)			
Building Blocks #1	149	**111**	30
Building Blocks #2	149	**111**	30
Communications	149	**111**	30
Data Base	399	**299**	80
Mathematics	99	**75**	20
Utilities	99	**75**	20
HARDWARE			
AST Advantage! (for AT)	595	**476**	
AST 6 Pack-0K	340	**229**	
AST 6 Pack-64K	395	**259**	
AST 6 Pack-128K	495	**299**	
MicroSoft Mouse	195	**144**	
Hayes 1200	699	**469**	
Hayes 1200B	599	**399**	
Hayes 2400	899	**659**	

SAME DAY SHIPMENT FOR ORDERS RECEIVED BY 1 PM
CALL FOR CORPORATE PRICES & TERMS. DEALER INQUIRIES WELCOME.
Copyright and licensing requirements of the software package manufacturers must be observed.

To place your order call TOLL FREE (800) 647-1200 (outside PA)
For more information and our FREE catalog call (412) 687-2000

COMPUTER INVENTORY CONTROL, INC.™

Above prices represent a 2% CASH discount

159 Techview Terrace • Pittsburgh, PA 15213 • (412) 687-2000

Circle 951 on reader service card

BULLDOG'S SPECIALS OF THE MONTH

Bulldog gets you out of the high price dog house!

If you're not buying from Bulldog, you're barking up the wrong tree

IBM PC
2 Drives 256 K Monochrome Monitor & Monochrome Printer Adapter
$1995

IBM PC
2 Drives 256 K Color/Graphics Adaptor, Princeton HX12 Color Monitor
$2295

IBM PC
256K 2 half-heights, 10 mb. Hard Disk
$2495

FREE shipping on all IBM SYSTEMS

64 K RAM CHIPS $2 each

BULLDOGS SOFTWARE PRICES ARE HARD TO BEAT!

WORDSTAR 2000	$279
Wordstar 2000+	329
LOTUS 123	299
LOTUS SYMPHONY	399
D BASE II	279
D BASE III	359
CROSSTALK	109
FRAMEWORK	369
COMPUSERVE STARTER KIT	25
SUPERCALE III Release 2 w/free sideways	195
THINKTANK	117
ELECTRIC DISK	239
WORDSTAR PROPACK	279

PRINTERS
The Pick of the Litter!

OKIDATA

ML 82 A	$299
ML 83 A	529
ML 84 P	649
ML 84 S	749
ML 92 S	479
ML 92 P	379
ML 93 P	575
ML 93 S	675

EPSONS

RX 100	359
FX 80	379
FX 100	549
LQ 1500	949
Interface for 1500	75

TOSHIBA

1340	649
1351	1149

STAR MICRONICS

SG 10	239
Power Type	349

BROTHER

DX 15	399
HR 25	649
HR 35	879

IBM PERIPHERALS

AST SIXPACK	$249
AST ADVANTAGE BOARD FOR ATw/128 K	419
PARADISE Multi Display	299
PARADISE Modular Graphics	289
STB MONOPLUS	159
HERCULES GRAPHICS	319
HERCULES COLOR	169

MODEMS

HAYES MODEM 300 B	199
HAYES MODEM 1200	399
HAYES MODEM 1200 B Comes w/Smart Com	369
SIGNALMAN MARK XII	239
VENTEL Half-card w/cross talk	389

CALL TOLL FREE 1-800-438-6039

IN GEORGIA 404-860-7364

Bulldog Computer Products

3833-A Washington Road/Martinez, Georgia 30907

Circle 865 on reader service card

What the world really needs is a 99 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

And DISK WORLD! has it.

Introducing Super Star Diskettes: the high quality diskette with the lowest price and the best LIFETIME WARRANTY!

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality.

The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers.

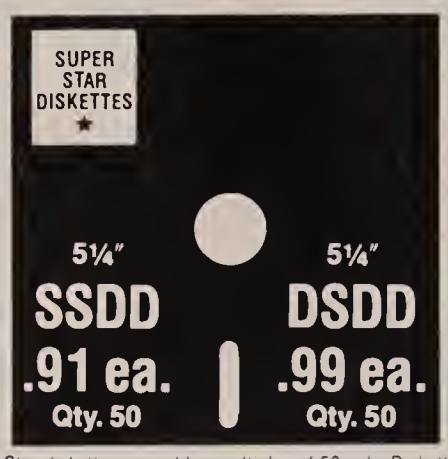
Rather they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5¼" diskettes. Same for DYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications...specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.



Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvec sleeves, reinforced hubs, user ID labels and write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And than we sell them to you.

Cheap.

When every little bit counts, it's Super Star Diskettes.

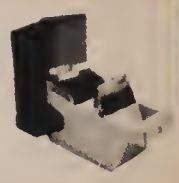
You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call their own.

We simply charge less.

Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only $8.75, shipping included...a lot less than the suggested retail price of $15.95.



Regular DISK WORLD! price: $10.95 ea. + $2.00 Shpng.

DISKETTE STORAGE CASES

PERFECTDATA DIAL 'N FILE
Terrific! Holds 10 5¼" diskettes. Just flip the lever and they all slide up for easy access and identification. Grey with smoked plastic front.
$2.75 Ea. + .35 Shpng.

DISK CADDIES
The original flip-up holder for 10 5¼" diskettes. Beige or Grey only.
$1.65 ea. + .20 Shpng.

DISKETTE 70 STORAGE
Dust-free storage for 70 5¼" diskettes. Six dividers included. An excellent value.
$11.95 ea. + $3.00 Shpng.

HOURS:
Human: 8AM-6PM Central Time, Monday through Friday
Answering Machine: 6PM-8AM, All Times
MCI MAIL: 24 hours a day.

HOW TO ORDER:

ORDERS ONLY:
1-800-621-6827
(In Illinois: 1-312-944-2788)
INQUIRIES:
1-312-944-2788

FOR FASTEST SERVICE, USE NO-COST MCI MAIL: Our address is DISKWORLD. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5¼" & 3½" DISKETTES—Add $3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional $3.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 8% sales tax.

MINIMUM ORDER: $35.00 or 20 diskettes.

The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective".)

WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.

DISK WORLD!, Inc.

Suite 4806
30 East Huron Street
Chicago, Illinois 60611

Circle 780 on reader service card

Contact us for other low prices on hardware and software.

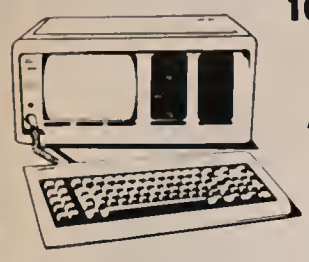
Next Day Air Extra

FREE SHIPPING. NO SURCHARGE FOR MasterCard OR VISA.

Call for latest prices.

COMPAQ®

256K, 1/360K drive, 10 Meg Internal



$2995

Functional equivalent to a Compaq Plus.™

Now using 3½" shock-mounted Winchester drives. The same as used in the Compaq Plus. ™

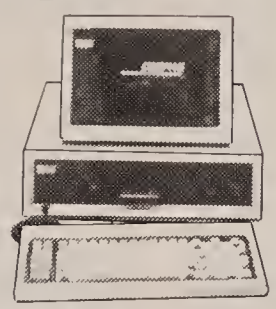
Also available with 2 half-height drives and 10 MEG HD—$3195.

Or upgrade your Compaq to a Compaq Plus™ equivalent with our 3½" shock-mounted Winchester disk kit. Includes Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware. One year warranty. **$995**

COMPAQ®

It simply works better. DESKPRO™

Functional equivalent to Compaq Deskpro ™ Model 4.



$3895

Includes Monitor

640K, One 360K Drive, One 10 Meg Internal Hard Drive, Tape Backup Unit.

Compaq is a registered trademark and Compaq Deskpro is a trademark of Compaq Computer Corporation.

XT™ POWER 135W

Solve your power problem. Fully XT™ compatible. One Year Warranty. Directly Replaces Power Supply in PC™.

$119

AT™ PRODUCTS

Fully compatible w/IBM PC AT™ Disk Controller, DOS 3.0 or 3.1

128K RAM SET FOR PC AT™

$149

20 MEG Internal Hard Disk

$795

33 MEG Internal Hard Disk

$1195

IRWIN™ MAGNETICS

TAPE BACKUP SYSTEM

$595

- Half Height
- Low Power
- Uses Floppy Controller Card
- 10.35 Meg Formatted Capacity
- Used in Compaq Deskpro™

10, 20, 33 AND 42 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

With Hard Disk by

Microscience International Corporation ®

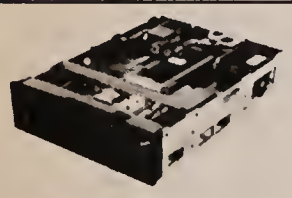
Half-Height

10 Meg Internal

$549

	20 MEG	33 MEG	42 MEG
Brand of Hard Disk	Microscience	Rodime	Rodime
Internal	**$695**	**$1395**	**$1595**
External	**$895**	**$1495**	**$1695**

Externals mounted with independent power supply and fan. Fully DOS 2.1 or 3.0 compatible. Both Internals and Externals boot from Hard Disk. 33 and 42 Meg Internal Disks include extender power supply. The system comes complete and ready to install with the Hard Disk, Controller, Cables, Manual, Software, and Mounting Hardware. One year warranty.



MITSUBISHI

(Japan's Best) Half-Height, DS/DD

$99

Tandon TM100-2 Full Height DS/DD

Control Data 94W Full Height, DS/DD

$129

TEAC 55B Half Height, DS/DD

$99

PANASONIC JA551-2, Half Height DS/DD

$99

Same as Shugart SA 455

64K RAM $16

Quantities of 1-49 sets

Set of 9 chips, 200 or 150 Nanoseconds

Quantities of 50-149 sets **$14** per set.

Quantities of 150 sets or more **$12** per set.

256K RAM Set of 9 chips **$95**

HARDWARE

Persyst Time Spectrum w/OK—$189 w/384K—$285

AST SixPak Plus w/384K	$329
AST SixPak w/64K	$249
Hercules Color Card	$175
Hercules Graphics Card w/Parallel	$349
Paradise Modular Graphics Card	$295
Paradise Module A Parallel Port	$ 69
Paradise Module B64-256K/Clock	$209
Persyst Monochrome Card w/Parallel	$175
PGS HX-12	$479
PGS MAX-12	$179
Epson	CALL
Juki 6100	$399
Okidata 92/93/84	$369/$569/$719
TI 855	$719
Hayes Smartmodem 1200	$449
Hayes Smartmodem 1200B	$369
Keytronic 5151 Keyboard	$189

SOFTWARE

dBase III—$349

Copy II PC	$24
Copywrite	CALL
Disk Explorer	CALL
Zero Disk	CALL
Prokey 3.0	$79
Sideways	$39
Thinktank	$119

BORLAND® INTERNATIONAL

Sidekick **Superkey** **Turbo Toolbox**
Non-Copy Protected Sidekick **Turbo Tutor**
Turbo Pascal 2.0 or 3.0 **Borland Gift Pack**
Turbo Pascal w/8087 2.0 or 3.0 **Borland Gift Pack w/8087**

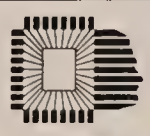
CALL FOR PRICES!

(Our prices are so low, they made us take them out of the ad.)

Norton Utilities— Version 3.0, Dec. '84 Release **—$59**

Wordstar 2000	$269
Wordstar 2000+	$319
Crosstalk XVI	$119
Multimate	$269
Lotus 1-2-3	$309
Lotus Symphony	$429

Terms: Due to our low prices and assurance that all merchandise is new, unused product, all sales are final. Call technical support for return authorization number on all warranty repairs. Any unauthorized return subject to a 10% restocking fee. Prepaid checks, money orders, VISA, MasterCard, American Express, or approved company purchase orders are accepted. No surcharge for VISA or MasterCard. 3% surcharge for American Express.



PC'S LIMITED

OUTSIDE TEXAS, ORDERS ONLY, CALL 1-800-IBM-5150

7801 N. Lamar, #E-200, Austin, Texas 78752

All calls for technical support and inside Texas, call (512) 452-0323.

Telex No. 9103808386 PC LTD

Microscience International Corporation, Irwin Magnetics, TEAC, COMPAQ, Panasonic, IBM, Mitsubishi, Borland International, and OKIDATA are trademarks of their respective companies. All brands are registered trademarks.

Ad number 305

Circle 34 on reader service card

THE MAINFRAME

When one of twenty Micro Mart Sales Pros answers a call, he's ready at his PC.

Micro Mart's Ten Million Dollar Inventory is on-line with our IBM Mainframe, so answers are fast and accurate.

With PC to Mainframe Inventory, this Micro Mart Salesman verifies his stock, quotes his best price and makes the sale.

Computers

CANON *Athena PC*, Color or Monochrome Systems. AT INTRODUCTORY LOW PRICES
LEADING EDGE Complete systems. _____ FROM **$1495**
THE COMPUTER SPECIAL OF THE MONTH! _____ CALL FOR DETAILS!

Networking / Protocol Conversion

SNA & BISYNC 3780, 5251 Mod 12 & Mod 11, 3274, 3278. _____
PC TURBO 186 *by ORCHID*, 80186 coprocessor board. _____ **$799**
IRMA Complete line. ___ FROM **$799**
FORTEGRAPH for IRMA, upgrades IRMA to 3279 S3G graphics. _____
IRMAPRINT Enhances IRMA graphics. _____
PC Net *ORCHID's*, new complete line. _____ FROM **$299**
TECHLAND SYSTEMS *Blue Lynx* 5251 Mod 12 & 3276 Emulators and 3270 Keyboards. _____
SANTA CLARA *PC Partner & PC Terminal*. _____ **CALL**

Printers & Plotters

We have thousands in stock.
THE PRINTER SPECIAL OF THE MONTH!
_____ CALL FOR DETAILS!
HOUSTON INSTRUMENTS Plotters & Digitizers. ___

Dot Matrix

EPSON *FX80 Plus/100 Plus*. _____
EPSON *LX80/100*. _____
EPSON *LQ1500*. _____
EPSON *JX80*, color printer. _____
COMREX *420*. 400 cps. Epson compatible. ___ **$1795**
OKIDATA *92 & 93, ML84*, (200 cps.), w/opt. IBM PROMS, *Pacemark 2410*(350 cps.) _____
OKIDATA Color printers. Complete line. _____
CANON Color printers. Complete line. _____
TOSHIBA *P-1351, 1340 & P-351*. **$1295 / $799 / CALL**
DATAPRODUCTS *P. Series 8050 Color & 8070*. _____
STAR MICRONICS Complete line. _____
TEXAS INSTRUMENTS *855, 865 & 850XL*. _____ FROM **$729**

Letter Quality

NEC *Spinwriters 2050, 3550, 8850*. _____
JUKI *6100/6300*. _____ **$419 / $749**
C-ITOH *Starwriter*(40 cps), *Printmaster*, (55 cps). _____ **$899 / $1299**
COMREX *CR II E, CR III & CR IV*. _____
We carry a full range of form handling options. Call for our unadvertised LQ Printers!!

Floppy Disk Drives

TANDON *TM 100-2*, DD/DS, 360K. _____ **$149**
1/2 HEIGHT DISK DRIVES: SHUGART, MITSUBISHI, TEAC. PC, XT & AT comp. _____ FROM **$119**
SPECIAL! Two 1/2 H.DD., "Y" cables & brackets. **$229**

Hard Discs

Micro Mart carries all the major brands. If you don't see it—ask for it.
PEACHTREE PERIPHERALS *P-10, 20, 30 & 50*, internal & external. For your PC, XT, AT, AT&T, COMPAQ or others. _____ FROM **$695**
SYSGEN 10 & 20 Meg w/streamer tape. _____ **NEW MODELS—CALL!**
SYSGEN *Image & Quickfile*, streamer tape back-up for your IBM XT & AT. _____ **CALL**
BERNOULLI TECHNOLOGY Hard Disc Subsytems. _____ FROM **$2595**
DAVONG New line of hard discs. 21 & 32Mb w/tape. _____ Start @ **$2495**

Chips

We guarantee the lowest price for chips!! Call us!!
INTEL 8087, 80287 High speed coproc. _ FROM **$129**
64K RAMCHIPS. _____ CALL FOR **MARKET PRICE**
256K RAMCHIPS. _____ CALL FOR **MARKET PRICE**
128K PIGGY-BACK Chips for your AT. _____ CALL FOR **MARKET PRICE**

Multifunction Boards

We have a complete line of multifunction boards compatible with the Portable, AT, XT, & Jr.
THE BOARD SPECIAL OF THE MONTH!
_____ CALL FOR DETAILS
SIX PACK 64-384K, multifunc. _____
MEGAPLUS 64-512K, max. 8 func. _____
MPII *RAMboards*, for PC & PC compatibles. ___ **CALL**
I/O MINNIE, I/O shortboard for Portable & AT. ___
ADVANTAGE 128K-3Mb, expansion for AT. ___ **CALL**
QUADRAM *QUADBOARD*, 64-384K. _____ **$259**
QUAD Jr. Expansion for PCjr. _____
TECMAR *CAPTAIN*, 0-384K multifunc. _____ **$199**
TECMAR *CAPTAIN Jr.*, Multifunction for Jr. _____
TALLTREE *J-RAM II*, 0-512K, w/software. _____
TALLTREE *J-RAM IIX*, 0-512K, w/software. _ **$129**
STB *RIO GRANDE & GRANDE BYTE*, Expansion for AT, 128K. _____ FROM **$259**
LEGACY Complete line of expansion products for Jr.

Graphic Cards

PREVIEW Monochrome graphics. Hercules look-alike for less. _____ **CALL**
HERCULES Mono & color graphics cards. _____
PLANTRONICS *ColorPlus +* HiRes color board, par. port w/software. _____ **New low price!**
TECMAR *Graphics Master*, HiRes color & mono supports Lotus. _____ **$459**
QUADRAM *Quadcolor I & II*, color cards. _____
PARADISE SYSTEM Multi-display or Mod. Graphics Cards, color & mono, par. port. _____ FROM **$299**

Software

ASK ABOUT THE SOFTWARE SPECIAL OF THE MONTH!

Accounting

SORCIM / IUS Complete line including windows. _____ FROM **$279 / EA.**
CYMA Complete business series. _____

MICRO MART HAS OVER 20 STORE LOCATIONS. CALL FOR THE ONE NEAREST YOU.

(404) 449-8089

Prices are subject to change without notice and are similar, but may vary at Micro Mart Retail Stores.

Service & Repairs
- On-Site—We have hundreds of service locations nationally.
- Depot—Our National Service Center is one of the fastest in the U.S.
- We Have—A wide variety of services available. Please call us.

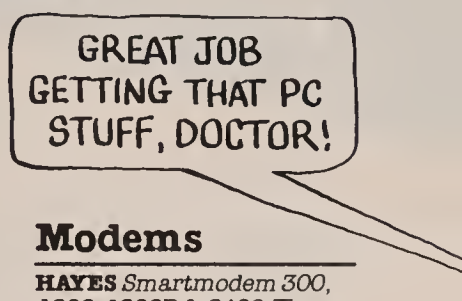
orders only

EVENT. 1-800-241-8149.

As the order is processed, each product is thoroughly tested before shipping.

Micro to Mainframe Order Entry and Processing is fast... then we can ship by Federal Express for next day delivery.

The result? Some very satisfied Micro Mart Customers!



Modems

HAYES *Smartmodem 300, 1200, 1200B & 2400.* The best stock in the U.S. _ **CALL**
PROMETHEUS *Modems.* ___
ANCHOR AUTOMATION *Signalman Mk XII.* _____ **$259**
VEN-TEL 1200 BAUD 1/2 Card for IBM Port. & XT. _____
POPCOM *Popcom*, int. & ext. w/voice and data comm. _____

Miscellaneous

DYSAN *DISKETTES*, PC, XT, & AT compatible. GUARANTEED LOWEST PRICE IN THE U.S. _____ **CALL!**
MOUSE SYSTEMS *PC Mouse*, optical w/ software. _____
MICROSOFT *MOUSE* Bus or serial mechanical mouse w/mouse menu software. _____
KEYTRONICS *5150 & 5151.* PC and Jr. Keyboards. _____
KENSINGTON MICROWARE *Master Piece.* _____ **$119**
CURTIS Accessories. Pedestals, cables, etc. _____
EDP Best selling line of surge protectors. _____ FROM **$35**
HAYES *Mach II & Mach III* Joysticks. _____
QUADRAM *Microfazer.* Printer buffer 8-128K. _____ FROM **$129**
TRIPPELITE Back-up power supply. 200-1000 watts, and *ISOBAR* surge protectors, 4 & 8 plug. ___
RUTISHAUSER Sheet feeders for all major brands. _
POLAROID *Palette.* _____

Spreadsheets & Integrated Packages

Call for our unadvertised spreadsheets!!
ASHTON-TATE *Framework.* _____
MICROSOFT *MultiPlan*, w/templates. _____
MDBS *Knowledge Man.* _____
SORCIM / IUS *SuperCalc 3*, vers. 2.0. _____ **NEW LOW PRICE!**

Enhancements & Utilities

FOX & GELLER Complete line of enhancements for dBase II, III & Rbase 4000. _____
NORTON Utilities 3.0. _____ **$69**
ROSESOFT *ProKey 3.0.* _____ **$89**
CENTRAL POINT SOFTWARE *Copy II PC.* _____ **$35**
ATI *Training.* _____ **$55**
SOFTSTYLE *Set Fx +* and *Printworks.* Printer control pkgs. _____
SIDEWAYS Inverts printout. _____ **$45**
BORLAND *Sidekick.* _____
LIVING VIDEO TEXT *Think Tank.* _____ **$125**

Compilers & Language Tools

LATTICE C-Compilers. _____ **$299**
MICROSOFT Complete line. _____
WORDTECH *The dBase compiler.* _____
DIGITAL RESEARCH Complete line. _____
BORLAND *Turbo Pascal, Turbo Toolbox* and more. _____ FROM **$35 / EA.**

Graphics & CAD

Micro Mart carries all the major CAD packages. Call if you don't see it.
Zsoft *PC Paint Brush*, mouse driven graphics. _ **$95**
DECISION RESOURCES *ChartMaster/ Sign-Master* pkgs. _____
MICROPRO *ChartStar.* _____
MICROSOFT *Chart.* _____

Communications

MICROSTUF *CROSSTALK XVI.* Latest version. _ **$99**
HAYES *SMARTCOM II.* _____

Word Processors

MULTIMATE w/Spelling checker & tutorial. _ **$259**
SAMNA + word processor. _____
MICROSOFT *Word.* New version. _____
LIFETREE *Volkswriter Deluxe.* _____ **$169**
SSI *WordPerfect.* New version. _____

Office & Project Planning

HARVARD *Total Project Manager.* _____ **$299**
SORCIM / IUS *Super Project.* _____
MICROSOFT *Project.* _____

Data Base Managers

Call for our unadvertised Data Bases.
MICRORIM *4000* or *6000, Report Writer & Clout* options. _____ **New low price!**
WARNER SOFTWARE The desk organizer. ___ **$145**
ASHTON-TATE *dBase II & III.* AT compatible. _____
MICROSTUF *Infoscope.* _____

Monitors and CRT's

PGS *Max12*, Amber, 720h x 350v. Monochrome. ___
PGS *SR-12* 690h x 480v, w/dual scan cd. _____
PGS *HX-12*, 690 Dot RGB. _____
QUADRAM *Quadchrome*, 690 Dot RGB. _____ **$429**
QUADRAM *Amberchrome.* Amber mono. ____ **$159**
AMDEK *Color 300, 500, 600, 700, 710, 722.* Complete line of color monitors. _____
AMDEK *300A/300G* Composite mon. ___ **$129 / $119**
AMDEK *310A*, Amber w/2 yr. warranty. _ **In Stock!!**
WYSE Terminals, 100, 75, 50. Entire line in stock. _
TAXAN RGB Color Monitors. Complete line at low, low prices. _____ **CALL!**

©Copyright Micro Mart 1985

Technology Corporate Campus
3159 Campus Drive
Norcross, Georgia 30071

Micro Mart has financing options available. Ask for a Micro Mart Blue Chip Credit Card application, today.

America's PC Specialist.

MICRO MART™

IBM is a registered trademark of International Business Machines Corporation.

Circle 112 on reader service card

Product Price Performance

PRODUCT — Let's be frank about product. The brand name hardware and software featured by advertisers in this magazine is usually the same high quality product. The major difference at Micro Flash is *availability*. We *stock* the products we sell and can *ship* for next day delivery if needed.

PRICE — Not every item in this ad will have the lowest price in the magazine. But you'll find Micro Flash consistently *competitive*, especially when you consider how well we *support* each product we sell.

PERFORMANCE — This is where Micro Flash *excells*. We'll stack our staff up against anyone's. They're chosen for their ability to *deliver* the support you deserve with every purchase.

415/680-1157 for product information, price quotes, technical support and California orders.
800/458-2433 outside California orders only.
Telex 353199 MFLASH UD

Micro Flash Terms: Telephoned P.O.'s accepted after credit approval. No credit card surcharge. Check must accompany non-CC orders. $6.00 shipping charge for UPS surface. Printers & monitors higher. Add $3.00 for UPS 2nd Day Air. Next day delivery available on request. All shipments fully insured at no charge. Call for information on CODs, US mail or foreign orders.

Member: Better Business Bureau, Chamber of Commerce Listed: Dun & Bradstreet

Software for IBM PC and Compatibles

	RETAIL PRICE	MICRO FLASH
ASHTON-TATE		
dBase III	$695.00	$359.00
FRAMEWORK	695.00	359.00
BORLAND INTERNATIONAL		
Sidekick	54.95	39.00
Sidekick (Unprotected)	84.95	59.00
Turbo Pascal	54.95	39.00
Turbo Pascal W/8087	94.95	69.00
Turbo Pascal 3.0	69.95	49.00
Turbo Pascal 3.0 W/8087	109.90	79.00
Turbo Pascal 3.0 W/BCD	109.90	79.00
Turbo Pascal 3.0 W/Both	124.95	99.00
Turbo Toolbox	54.95	39.00
Turbo Graphix Toolbox	54.95	39.00
Turbo Gift Pack	104.95	74.00
Turbo Gift Pack W/8087	144.95	109.00
Superkey	69.95	49.00
MICROSOFT		
Word & Spell	375.00	239.00
Project	250.00	155.00
Chart	250.00	155.00
Flight Simulator	49.95	35.00
Multiplan™	195.00	125.00
Budget	150.00	69.00
Financial	100.00	49.00
Cash Plan	150.00	69.00
BASIC Compiler	395.00	276.00
Business BASIC Compiler	600.00	418.00
C Compiler 3.0	395.00	276.00
Pascal Compiler	350.00	244.00
FORTRAN Compiler	350.00	244.00
COBOL Compiler	700.00	495.00
Macro Assembler	150.00	115.00
MULTIMATE INTERNATIONAL		
MultiMate	495.00	259.00
SSI		
WordPerfect 4.0	495.00	259.00

Call About Full Line of Macintosh Software

Hardware for IBM PC and Compatibles

	RETAIL PRICE	MICRO FLASH
AST RESEARCH		
SixPakPlus 64K	$395.00	$269.00
REACH! Half-Card Modem	549.00	469.00
64K Upgrade Kit	75.00	40.00
512K Upgrade Kit	500.00	399.00
HAUPPAUGE		
Intel 8087 Chip	175.00	157.00
Intel 80287 Chip	295.00	275.00
HAYES		
Smartmodem 1200	699.00	459.00
Smartmodem 2400	899.00	CALL!
HERCULES		
Graphics Card	499.00	329.00
ColorCard	245.00	179.00
IOMEGA		
Bernoulli Box 20MB	3695.00	CALL!
MICROSOFT		
Serial Mouse W/Software	195.00	135.00
Bus Mouse W/Software	195.00	135.00
ORCHID TECHNOLOGY		
PCturbo 186 W/128K	1095.00	879.00
PCturbo Daughtercard	265.00	199.00
PRINCETON GRAPHICS		
Max 12 Amber Monitor	249.00	185.00
HX 12 Hi-Res RGB Monitor	695.00	499.00
SR12 Super Hi-Res RGB	799.00	629.00
Scan Doubler Board For SR 12	249.00	179.00

hardware

software

Many other products available at comparable discounts!

Quantity pricing available!

COMPUTER SYSTEMS, INC.
1110 Burnett Avenue
Concord, CA 94520

Circle 108 on reader service card

Introducing MAESTRO AT™

The Multifunction Board That Fine Tunes Your IBM PC-AT

If you own an IBM PC-AT, or if you're considering a purchase, you should know: the most cost-effective multifunction board on the market is Maestro—offering savings of up to $1500 per board.

Whether you're using Symphony™, working with spreadsheets or dialing into a data network, you'll find that Maestro's functionality and simplicity make it the kind of computer tool you won't want to be without.

Maestro has a prodigious memory.

Two memory blocks give you a range of memory that allows you to upgrade your PC-AT from 256K or 512K to nearly three megabytes. Then put all that memory to work running large business software programs. Supporting multi-user, multi-tasking systems like XENIX™. Processing large routine programs quickly. Or accommodating RAM disks at will.

The basic design is so sound, you can almost forget about maintenance.

Our innovative one-card design provides full 1" spacing for optimum cooling, unlike piggy-backed cards.

Installation couldn't be simpler.

Maestro eliminates as many as 14 separate switches found on other boards, and offers maximum versatility in memory configurations.

You'll applaud the versatility.

Maestro's parallel port and serial port handle all the peripherals you're likely to need. The serial port's built-in connectors eliminate costly cable converters for maximum savings.

Maestro comes with a valuable accompaniment.

To increase its value to you even more, every Maestro board comes with a complimentary Treasure Chest™ of software. The 24 business productivity programs include a calculator, a security system, memo pad, electronic address book, calendar, and hardware diagnostics.

With Tecmar, you can always expect an encore.

Tecmar developed the very first peripherals for the very first IBM PC. We've been building our expertise, our product line and our reputation for service ever since.

If you like the sound of all this, we suggest you see your nearest Tecmar dealer for a closer look at the Maestro board. To find out who your local dealer is, call us at 216/349-1009.

Available in quantity now!

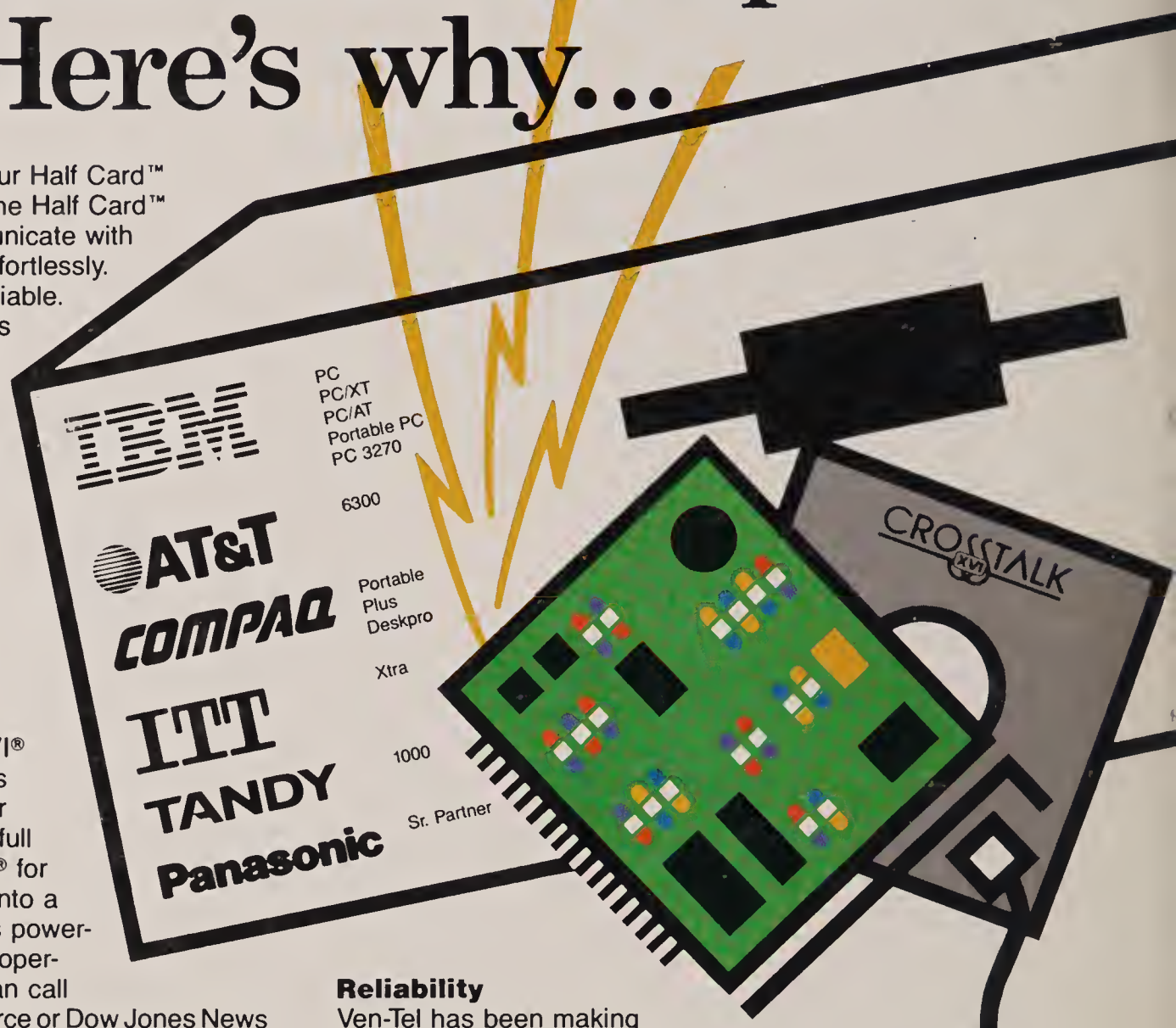
Tecmar

THE POWER BEHIND THE PC

6225 Cochran Road, Solon, Ohio 44139

Circle 190 on reader service card

Ven-Tel's Half Card™ modem is in all the best computers. Here's why...



Ven-Tel gives you lots of reasons to buy our Half Card™ modem for your IBM PC or compatible. The Half Card™ is a complete system that lets you communicate with other PCs, mainframes, and databases effortlessly. It includes Crosstalk-XVI® software. It's reliable. It's got all of the features you want. And it's a good value.

Do You Own One of These Computers?

Chances are you do. And if you're thinking of buying a modem, consider the Half Card™. Because of its small size, the Half Card™ fits in more computers, including all of the models we've listed here. The Half Card™ is small, so it fits in short slots or long. That means you can save your long slots for other expansion uses.

Effortless Communication

Each Half Card™ comes with Crosstalk-XVI® communications software, by Microstuf. It's the easiest to use, whether you're a beginner or an old hand, and the most powerful. A full on-line help menu makes using Crosstalk® for the first time a snap. It can turn your PC into a terminal on a mainframe computer with its powerful terminal emulation feature. It will even operate your PC when you're not there. You can call into an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, all at the touch of a button. The Half Card™ connects your computer to the world. Effortlessly.

More Modem for Your Money

When you buy the Half Card,™ you don't need anything else. The Half Card™ is a complete communications package that includes a full-featured modem and the best known software on the market. Complete easy-to-understand instructions with full technical support on installation and use. And a very competitive price. The Half Card,™ with Crosstalk-XVI® software, retails for only $549.

Reliability

Ven-Tel has been making modems for 10 years. Our experience shows. Ven-Tel's Half Card™ only has about 70 parts, compared to almost 300 on other modems. We reduced the parts by building the first LSI modem chip using advanced switched capacitor technology. What that means to you is greater reliability and lower power consumption, so you can load up your PC with expansion boards and not worry about heat or power problems. And we back the Half Card™ with a full two-year warranty on parts and labor.

Features

- 1200/300 baud auto-dial, auto-answer.
- Uses the industry standard "AT" command set.
- Runs with virtually all communications software, including Smartcom II and PC Talk III and integrated packages such as Symphony and Framework.
- Includes Crosstalk-XVI® software.
- On-board speaker and extra phone jack for easy switching from voice to data mode.
- Selective tone or pulse dialing; full or half duplex.
- Automatic answer on any ring.
- True ring or busy signal detection.

You Can Buy the Half Card™ Anywhere

You can get the Half Card™ at ComputerLand, Businessland, the Genra Group, Entré Computer Centers, Macy's Computer Stores and other fine dealers nationwide. Also from Ven-Tel: the 1200 Plus,™ an external modem and the PC Modem 1200,™ an IBM internal with V.22 international capability.

Effortless Communication

Ven-Tel Inc.

2342 Walsh Avenue
Santa Clara, CA 95051
(408) 727-5721

Crosstalk is a registered trademark of Microstuf, Inc. Smartcom II is a trademark of Hayes Microcomputer Products. Symphony is a trademark of Lotus Development. Framework is a trademark of Ashton-Tate.

Circle 193 on reader service card